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ABSTRACT

The primary purpose of the present research was to explore the relationship of ability and intrinsic motivation in the prediction of job performance. Intrinsic motivation was traced to two primary determinants. One, an organizational factor, is the extent to which an employee's job is "enriched," or incorporates challenging elements such as autonomy and variety. A second determinant is an individual difference factor--the extent to which the individual desires to achieve and grow. Data were collected from 353 clerical employees in a large, metropolitan bank. Ability was measured by a pre-employment clerical aptitude test; information about job characteristics, individual growth needs, growth satisfaction, and intrinsic motivation was obtained by an employee questionnaire; and job performance was measured by supervisors' evaluations. The hypotheses were tested by hierarchical moderated multiple regression. Ability and intrinsic motivation combined in an additive way but not in an interactive way in predicting job performance. (Author/BW)

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INTRINSIC MOTIVATION AND ITS DETERMINANTS AS FACTORS
ENHANCING THE PREDICTION OF JOB PERFORMANCE FROM ABILITY

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
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ANN HOWARD

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employee's job is "enriched," or incorporates challenging elements such as autonomy and variety. A second determinant is an individual difference factor--the extent to which the individual desires to achieve and grow.

Two primary hypotheses were tested: (1) Performance = Ability + Intrinsic motivation + (Ability x Intrinsic Motivation), and (2) Intrinsic motivation = Individual growth need strength + Enriched job characteristics + (Individual growth need strength x Enriched job characteristics). A third hypothesis was the same as hypothesis two, but predicted the criterion of satisfaction with opportunities for growth on the job.

Data were collected from clerical employees in a large, metropolitan bank. The final sample consisted of 353 employees in 11 job groups. Ability was measured by a pre-employment clerical aptitude test; information about job characteristics, individual growth needs, growth satisfaction, and intrinsic motivation was obtained by an employee questionnaire; and job performance was measured by supervisors' evaluations.

The hypotheses were tested by hierarchical moderated multiple regression. All multiple R's were statistically significant, showing initial support for the hypotheses. Ability and intrinsic motivation combined in an additive way but not in an interactive way in predicting job performance. Intrinsic motivation was predicted only by the enriched job characteristics, and growth satisfaction was predicted positively by the enriched job characteristics and negatively by growth need strength. A modified model demonstrated that ability, enriched job characteristics and growth need strength each add significantly and positively to the prediction of job performance, but no interactions among the variables made significant contributions to the prediction. It was suggested that intrinsic motivation is a useful construct that is not yet well measured.

Analyses by race and by sex showed lower average ability scores for Blacks and males. Although no differential prediction was evident for the motivation and satisfaction criteria, there were race and sex differences in predictions of performance. Males appeared to have greater growth need strength compensating for lesser ability. Hence, multiple regression equations developed in the total sample (which was primarily White females) also predicted performance for males if growth need strength was included with ability. The Blacks had no apparent compensating factors at the present time, but it was deduced that if more challenging jobs and greater acceptance by peers accrue with more job experience, a compensatory model might be appropriate for this subgroup.

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CHAPTER I

INTRODUCTION

Ability measures have been demonstrating their power to differentiate potentially high from low performers since the turn of the century. But a major source of dissatisfaction among personnel psychologists is that there has been almost no improvement in the predictive validity of ability tests during their history (Atkinson, 1974). The average correlation of ability tests and performance is only .20 (Ghiselli, 1966). This generally weak selection test validity is especially problematic in a time when much attention is directed to the question of whether or not tests are differentially valid among majority and minority groups (e.g., O'Leary, Farr, & Bartlett, Note 1).

One approach to raising validity coefficients for ability tests has been to attempt to refine criterion measurement. Although many advances have been made on this front, predictive validity has not been markedly improved. Attempts to raise validity coefficients by attention to predictors have included careful selection of tests that are appropriate to the abilities required by the job. Yet, even when this is done, validity coefficients are only moderately high. The average maximum correlation between ability tests and performance is about .35, and it seldom exceeds .65 (Ghiselli, 1966). The importance of careful selection and development of both predictor and criterion measures cannot be minimized, but these approaches alone have not solved the validity problem.

If maximum efforts to purify both sides of the ability-performance relationship still result in weak predictions, perhaps the answer lies somewhere between the predictor and the criterion. One relatively unexplored possibility is that organizational or personal factors may inhibit or prevent individuals from performing up to their capabilities. The primary problem then becomes one of bringing to expression in job performance the abilities individuals already possess. This is considered to be the role of motivation (Maier, 1955).

Motivation and Ability

The distinction between the capacity to work (ability) and the will to work (motivation) was made as long as forty years ago (Mace, 1935). Maier (1955) is usually given credit for specifying an interactive relationship between the two constructs. Since Maier considered ability to be equivalent to aptitude x training, his actual formula was:

$$\text{Production} = \text{aptitude} \times \text{training} \times \text{motivation} - \text{fatigue}$$

A clearer and more popular representation of Maier's formula is as follows (Vroom, 1964):

$$\text{Performance} = f(\text{ability} \times \text{motivation})$$

The interactive function stems from the argument that if either ability or motivation is low, performance cannot be high. That is, if motivation is low, performance will probably be low even if ability is high, since one would be disinclined to manifest one's ability. If ability is low, performance will be low regardless of motivation, because performing beyond one's ability is not possible. This argument is diagrammed in Figure 1.

		Ability	
		Low	High
Motivation	High	Low performance	High performance
	Low	Low performance	Low performance

Figure 1: Diagram of $\text{Performance} = f(\text{ability} \times \text{motivation})$

Going one step further, if motivation is low, there should be little or no variability in performance since it will generally be low for all individuals. Thus the prediction of performance from ability will be poor because of a lack of variability in the criterion. If motivation is high, there should be considerable variability in performance that corresponds to the variability in ability. In this case validity coefficients for the ability measures should be substantial (providing, of course, that the predictors and criteria are well chosen and measured). This situation is diagrammed in Figure 2.

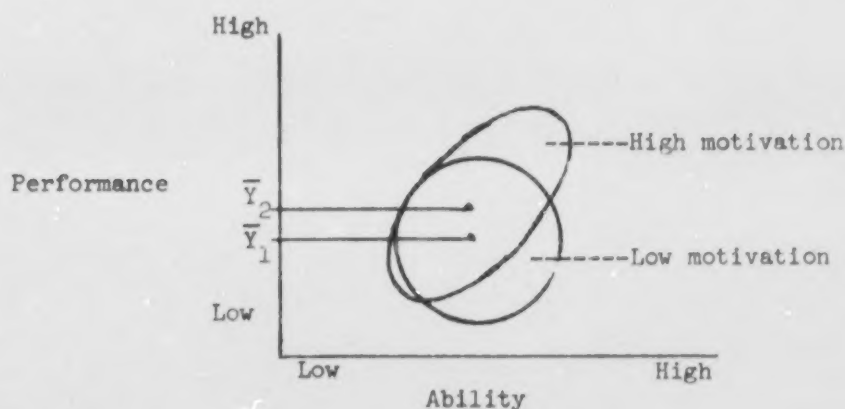


Figure 2: Prediction of performance from ability under varying conditions of motivation

Statistically there is an interaction between ability and motivation in Figure 2, as specified by the formula "Performance = f (ability x motivation)". In addition, Figure 2 raises two important conceptual and practical issues. The first issue concerns performance predictability. Under low motivation conditions one should be unable to predict performance from ability measures; under high motivation conditions one should be able to predict it quite well. The second issue has to do with average performance level. As can be seen in Figure 2, average performance under the low motivation conditions ($\bar{Y}_1$) is lower than average performance under the high motivation conditions ($\bar{Y}_2$), so that high motivation should increase the average level of worker performance.

The ideas just presented about the hypothesized interaction of ability and motivation and the resultant impact on predictor/criterion relationships lead to the conclusions that factors which suppress motivation can result in (a) loss for the organization, and (b) loss for the individual, particularly the high ability individual. The organization is left with depressed average levels of performance, while the individual may not realize some potentially important personal goals and values. Indeed, boredom and job dissatisfaction are highly probable, since "the most pervasive source of dissatisfaction expressed by today's work force is that their abilities are not being utilized" (Dunnette, Note 2).

One intention of the research effort here is to explore further the relationship of ability and motivation in the prediction of job performance. Moreover, the attempt will be made to discover some

organizational conditions and non-ability characteristics of individuals associated with higher levels of motivation. If these conditions and characteristics could be arranged more systematically in organizations, the logical result should be higher predictability for ability tests, higher average levels of worker performance, and greater employee satisfaction.

In the sections that follow, the literature on ability and motivation and the determinants of one particularly relevant type of motivation, intrinsic motivation, will be reviewed. Building on the research and theorizing summarized here, specific hypotheses are formulated and their test in an ongoing organization is described.

Research on Performance = f (Ability x Motivation)

The idea that performance is a function of the interaction of ability and motivation has been demonstrated to have some intuitive appeal. Within the context of attribution theory, Heider (1958) suggested that judgments of performance would follow the model of an interaction of ability and motivation. Anderson and Butzin (1974) tested his hypothesis in an experiment where 20 students judged stimulus persons' performance based on motivation and ability information presented in various combinations of four levels of each. Two types of stimulus persons were judged--applicants to graduate school and athletes trying out for college track. The performance judgments showed that the higher the level of motivation, the steeper the curve representing the prediction of performance from ability. Analyses

of variance showed a significant interaction of ability and motivation in judging performance of both types of stimulus persons ($F = 7.98$ for athletes and $F = 6.15$ for students). These results suggest an interactive model in performance attribution.

Studies testing the hypothesis that performance actually is a function of the interaction of ability and motivation have been conducted sporadically over the past 20 years. Far from systematic or programmatic, the research employed a wide variety of measures, methodologies, and theoretical underpinnings. The accumulated body of evidence is reviewed below.

Early Studies

A post hoc analysis of a study conducted in the 1930's was offered by Vroom (1964) as an initial piece of evidence that ability and motivational variables have an interactive effect on performance. Wyatt (1934) studied the effects of hourly, bonus, and piece-rate methods of pay on the performance of 10 females in a candy factory. The 10 women rotated, 2 at a time, through jobs, each pair simultaneously experiencing changing methods of payment. The incentive systems apparently had a strong impact on motivation, since performance increased as the women moved progressively from an hourly to a bonus to a piece-rate method of pay. Still there were performance differences between each pair of women working on the same task under the same conditions. If the assumption is made that this productivity difference is primarily a reflection of ability, the interaction of ability and motivation in influencing performance receives

some support. That is, as motivation was increased by the more individualized payment system, there was a greater effect on the level of performance of those initially performing at a relatively high level (high ability women) than on those who were initially performing at a relatively low level (low ability women).

More precise statistical evidence of this phenomenon was offered by French (1957, 1958). She hypothesized that performance in a problem-solving situation would be related to ability level among subjects with high achievement motivation, but that there would be little or no relationship among subjects with low achievement motivation. To test this hypothesis, 96 airman were required to create specific patterns of lights on a problem-solving apparatus. Motivation was measured by the Test of Insight, a projective measure in which respondents are asked to attribute the "cause" of a series of briefly described behaviors. Ability was measured by the Armed Forces Qualification Test (AFQT), and subjects were selected so that equal numbers scored within three 10-point ranges. Since motivation scores were divided at the median, the data were subjected to a 2 x 3 analysis of variance. The main effect of motivation was significant at $p < .001$, the main effect of ability was significant at $p < .01$ and the interaction was significant at $p < .01$, providing some evidence in favor of the ability x motivation interaction hypothesis. In support of the diagram in Figure 2, the AFQT correlated .60 with performance for the high motivation group and .08 for the low motivation group.

A test of the ability x motivation hypothesis was made with psychomotor skills by Fleishman (1958). Again subjects were basic trainee

airmen ($N = 400$), and their task was a Complex Coordination Test in which adjustments of stick and rudder controls were made in response to successive patterns of visual signals. Ability was measured not by testing, but by total scores obtained by each subject during the initial five trials on the task. Half the subjects were given motivation instructions, whereby it was indicated that they should do their best on the task since it would have an important bearing on their future assignments in the Air Force. Verbal incentives, such as directions to try harder or to try to improve to a certain score, were given during rest periods. The remaining subjects served as a control group and were given no motivating instructions. Subjects were divided into two ability groups, depending on whether their scores on the first five trials fell above or below the median, and a 2×2 analysis of variance was calculated. The main effects of ability and motivation and their interaction were all significant at $p < .01$, supporting the hypothesis that ability interacts with motivation in determining performance. It should be noted that both the French (1957, 1958) and Fleishman (1958) studies showed main effects for both ability and motivation in addition to the interaction effect, in spite of marked differences in their methods of measurement.

A research design similar to Fleishman's (1958) was used by Locke (1965) in an attempt to examine the ability $\times$ motivation interaction in four laboratory studies. In all studies two ability groups were formed by dividing subjects at the median on the basis of their performance on an initial practice trial on which subjects were told to do their best. High motivation groups were given specific

difficult goals on each task; low motivation groups were either told to do their best (a questionable instruction for low motivation) or given specific but easy goals. The tasks were either psychomotor skills (Study 1 used the Complex Coordination Task previously used by Fleishman, 1958) or naming things (uses for a series of objects, or things that can be described by a given adjective). The ability x motivation interaction was significant for only one of the four studies. Although overall the data gave some suggestion that the effects of motivation may be relatively greater for high ability subjects, there was little evidence that these effects have no significance for low ability subjects. The ability measures may have been confounded by some motivation effects, however, since they were trials on which subjects were told to do their best.

Some more positive evidence for the ability x motivation interaction was provided by Vroom (1960) in a study of the effects of participation in decision making on supervisor satisfaction and performance. Subjects were classified as high, moderate, or low in motivation for effective performance based on a combined motivation measure indicating the degree to which workers participated in decision making and the strength of their need for independence. Using scores on four tests of ability and four measures of job performance, Vroom found fairly high positive correlations between ability and performance measures for supervisors high in motivation, generally lower positive correlations for those moderate in motivation, and zero or slightly negative correlations for those lowest in motivation.

Lawler (1966) operationalized motivation in the work setting by a composite measure of the degree to which pay was seen to be

contingent upon job performance. Superiors ranked a sample of 211 managers from 3 divisions of state governments on the extent to which they had the necessary abilities and experience to perform their jobs well -- an imprecise measure of ability at best. Respondents were divided in half both on the basis of high and low pay/performance contingency attitudes and high and low supervisory ability rankings. A 2 x 2 analysis of variance using superiors' rankings of performance as the criterion showed the main effect of ability significant at $p < .01$ and the main effect of contingency motivation significant at $p < .05$, but the interaction only approached significance ($p < .06$). When self-ratings of job performance were used as a criterion, the ability main effect was nonsignificant, the contingency main effect was significant at $p < .01$, and the interaction was significant at $p < .05$.

Looking at the Lawler (1966) data another way, the correlations between ability and self-ratings of performance were $-.06$ for the low contingency group (ns) and $.17$ for the high contingency group ($p < .05$). With superiors' rankings as the criterion, r was $.43$ for the low contingency group and $.61$ for the high contingency group (both $p < .001$, but there was no test for the significance of this difference). Overall, the strongest data showed that self-reports of motivating conditions best predict self-reports of performance, and supervisory reports of ability best predict supervisory ratings of performance--indications of confounding method variance. However, the study provided some support for the hypothesis that performance is a function of an ability x motivation interaction.

All of the preceding studies show at least some support for the hypothesis that performance is a function of the interaction of ability

and motivation. Since methods of measuring both ability and motivation varied widely, the combined evidence is more persuasive than any single study.

Research Using the VIE Theory of Motivation

The remaining studies investigating the interaction of ability and motivation in the determination of performance have all been conducted within the context of some version of the Valence-Instrumentality-Expectancy (VIE) theory of motivation. The first complete model of this theory was formulated by Vroom (1964) and has undergone a number of revisions by such authors as Porter and Lawler (1968), Graen (1969), Campbell, Dunnette, Lawler and Weick (1970), Lawler (1971, 1973), and Dachler and Mobley (1973).

The basic VIE model can be abbreviated:

$$\text{Force} = E (\Sigma V \cdot I),$$

where Force refers to the force on an individual to perform an act; in the research considered here, Force is considered equivalent to motivation to exert effort on a job. Force is hypothesized to be a monotonically increasing function of the other three terms in the equation above:

E = the expectancy that certain levels of effort will lead to certain levels of performance,

V = the valences or perceived attractiveness of various outcomes of performance, and

I = the instrumentality of various levels of performance for attainment of these outcomes.

Vroom (1964) stated further that performance is a function of the ability x motivation interaction, where motivation is defined by the above formula.

Although there have been many tests of VIE theory as a model of work motivation (cf. Mitchell, 1974), only a few have also looked at the relationship between ability and motivation as defined by the VIE models. Galbraith and Cummings (1967) claimed to test the interaction, although their ability measure appears highly questionable--operative workers with greater than six months tenure were called high ability, while those with less tenure were called low ability (total N = 32). In addition to assuming that ability = experience, the authors assumed there were no noncontrollable environmental influences between exertion of effort and performance, so that the VIE expectancy term = 1. Their model presented motivation as a sum of valence due to ego involvement in the task plus valence x instrumentality for each of five extrinsic rewards (money, fringe benefits, promotions, supportiveness of supervisor, and group acceptance).

Valences, instrumentalities, and ability were each dichotomized and entered into a series of dummy variable regression equations. The authors reported that the only significant contributions to the variance in productivity output were motivation x ability interactions; supportiveness $V \times I \times A$, money $V \times I \times A$, and ego involvement $V \times A$ produced a multiple R of .68, leading the authors to conclude that there was some support for the hypothesized interaction of motivation and ability. Their statistical methods, and consequently their conclusions, must be questioned, however. Although the product terms they reported carry interaction information, according to Cohen and

Cohen (1975, p. 295) these terms are not the same as the interaction until all main effects and any lower-order interactions are partialled out. Hence, hierarchical regression equations are called for rather than the stepwise regression equations used. Moreover, the use of multiple regression for 5 equations with 7 independent variables (extrinsic rewards) and 1 equation with 3 independent variables (task involvement) on a sample of only 32 subjects invites fitting so much random error that the results cannot be taken as meaningful.

The model of VIE theory proposed by Lawler and Porter (1967) and Porter and Lawler (1968) was tested by Gavin (1970). This model deviates from Vroom's (1964) in two major respects. First, the expectancy and instrumentality terms are combined into an effort-reward probability, since Porter and Lawler found that the frequencies with which the job behaviors of working hard and performing well lead to each reward are highly correlated. Second, they postulate that both ability and role perceptions moderate the relationship between motivation and performance. Role perceptions will not be explored here, since the evidence on this construct is sparse and the present concern is with ability and motivation.

Gavin (1970) studied 192 male and 175 female managerial candidates in an insurance company. Ability was measured by the LOMA Test 1A, a general aptitude test, and motivation was measured by weighting the effort-reward probabilities of 21 outcomes by their valences. Since ability did not correlate with supervisory ratings of performance in either sample, the explanation was offered that managerial effectiveness does not necessarily require bookish, scholarly, intellectual activity, and standard occupational aptitude tests

have little utility for predicting managerial performance (Guion, 1965). Motivation was significantly correlated with performance (r 's in the .20's, $p < .01$ for both samples). Multiple regression equations showed that adding ability to motivation did not increase prediction, nor did adding the ability x motivation interaction, probably because of the lack of a meaningful relationship between the general ability test and the supervisory ratings.

Heneman's (1971) test of VIE theory was similar to Gavin's (1970), except that he used a separate expectancy term in accordance with Vroom's (1964) rather than Porter and Lawler's (1968) VIE model. Heneman's sample consisted of 79 managers of a large midwestern department store, and the performance measure was a score derived in an annual Management by Objectives performance evaluation. The ability measure was total score on the Otis Employment Test, used by the company for selection of managers. Since the test did not correlate with performance, two explanations were offered: either mental ability tests are simply poor predictors of managerial performance (Guion, 1965), or there was a restriction of range from using the ability measure for selection. Both explanations could also be applied to Gavin's (1970) lack of significant validity in a similar situation.

Heneman (1971) also found that motivational force, calculated as expectancy times the sum of valence x instrumentality for 23 outcomes, did not correlate with performance. Multiple R 's using Force, Ability, each of three measures of role perception separately, plus two-way and three-way interactions also were not significant (R 's for the three main effects ranged from .19 to .23 and R 's for the full

equations ranged from .26 to .37). Although Heneman did not report ability and motivation findings independent of role perceptions, based on the other data presented, it is unlikely that a multiple R would be significant. Heneman noted that the magnitudes of the R's in his and Gavin's (1970) studies were similar, but Gavin's larger sample sizes permitted him to demonstrate statistical significance.

Arvey (1972) tested VIE theory in a laboratory setting with 180 male college undergraduates performing an arithmetic task. The design used three levels of ability, derived by trichotomizing scores on the American College Math test, three levels of expectancy, and two levels of instrumentality. A three-way analysis of variance between expectancy, instrumentality and ability showed only a significant main effect for ability ($p < .001$); the correlation of ability with performance was .43. A multiple regression analysis showed that expectancy produced an R of .11, instrumentality added nothing to the R, expectancy + instrumentality + (expectancy x instrumentality) produced an R of .14, but expectancy + instrumentality + ability produced an R of .45. McNemar's (1962) F test showed that the gain in adding the ability variable to the two motivational variables was statistically significant at $p < .01$, producing an increase of 19% in amount of variance explained. The two-way and three-way interactions contributed only 6% in amount of variance explained over the simple additive model, a non-significant increment to the multiple R. Since ability correlated .43 with performance, and the multiple R of ability and the two motivational variables (without interactions) correlated only .45 with performance, the motivational variables did not make a very

meaningful contribution to prediction. It should be noted that this is the first study reviewed where an aptitude test was directly related to the task.

Dachler and Mobley (1973) attempted to test the ability x motivation interaction in their study of VIE theory but were somewhat hampered by a lack of available ability test scores. In their Plant 1, for the 46 new employees for whom ability test information was available, ability correlated significantly with quarterly average performance ($p < .05$). The motivation index, which was the VIE formula for the level of performance with optimal expectancy per subject, correlated only .06 with performance in Plant 1 (perhaps, suggested the authors, because the short-tenured employees had not as yet established stable instrumentality and expectancy perceptions). Although Dachler and Mobley (Note 3) inappropriately referred to the product of ability and motivation as the interaction term and commented on its correlation with performance, they also computed the multiple R of ability, motivation, and their interaction. No significance test was performed to evaluate whether motivation or the interaction added to the multiple R, but its size ($R = .37$) compared to the simple r of ability and performance ($r = .36$) indicates that the contribution of the two additional terms would not be meaningful. In their Plant 2, motivation indices and 17 ability tests were ineffective predictors of performance, and multiple R's of these variables and their interactions appeared to be non-significant (Dachler & Mobley, Note 3).

The VIE model of motivation and various combinations of its components were tested by Lawler and Suttle (1973) using 18 outcomes.

The sample consisted of 69 department managers in 6 retail stores on a pay incentive plan. Ability was measured by the Thurstone Test of Mental Alertness, which gives a verbal, quantitative, and total general ability score. Performance measures included subjective performance rankings by self, boss, and peers, and objective sales data.

The total VIE model correlated .32 ($p < .01$, one-tailed) with self-rankings but was not significantly correlated with any other performance data. Ability was not correlated with any performance criterion, an unsurprising finding since general ability tests usually are poor predictors of sales performance (Ghiselli, 1966). With each criterion a multiple correlation including expectancy + role perception + total ability score was significant ($p < .01$, one-tailed), but no test was made to see if ability really contributed significantly to the multiple R. A multiplicative combination of the three variables had significant r 's ($p < .05$) with two of the four criteria, but, contrary to the authors' interpretations, this multiplicative combination does not really answer the question of whether ability and motivation interact to predict performance.

Mitchell and Nebeker (1973) also tested a multiplicative combination of ability and several measures of motivation, using log transformations of the dependent and independent variables to represent the products ($\log P = \log A + \log W$ is equal to $P = A \times W$ where P = performance, A = ability and W = effort). With simple regression, both additive and multiplicative combinations of ability with various motivation measures usually had a lower correlation with performance than did ability alone ($r = .57$, $p < .01$). The strong correlation

between ability and performance is not surprising, since predictor-criterion relevance was well established: the ability measure was predicted grade point average based on a pre-college entrance examination and high school grades, and performance was measured by one quarter's grade point average for 60 male undergraduates. Motivation was operationalized in several ways, including the total VIE model, average number of hours spent per week studying (self-report), attitudes toward academic effort, and a model of expectations by professors and peers. Multiple R's were higher than simple r 's when ability was combined with motivation for both additive and multiplicative models, but the results were dismissed as unconvincing since multiple regression fits error. No significance tests were reported for adding any components in multiple regression to the predictions of performance by ability alone. Moreover, it does not appear that both additive and multiplicative components were included in the same regression equation to provide an appropriate test for the interaction effect of ability x motivation.

The total VIE model and its relationship to ability was also tested by Sheridan, Slocum, and Min (1974). Their sample consisted of 138 workers employed on routine tasks in a steel fabricating plant on an incentive payment plan. To comprise the VIE model, fourteen outcomes were rated for valence and instrumentality, and two questions (one regarding control over quality, the other on the relationship between effort and production rate) were used to measure expectancy. Ability was measured by the Army General Classification

Test, a test of general learning ability, and performance was measured by a two-week productivity index. The VIE model of motivation correlated significantly with performance ($r = .23$, $p < .01$). Ability had a nonsignificant correlation with performance ($r = .14$), explained by the authors as a problem of diminishing congruity between abilities and tasks over time as the workers' jobs become more specialized. The product of ability and motivation had a simple correlation of .28 with performance ($p < .01$); from this the authors concluded that inclusion of ability had no significant effect on the model since the correlation of performance with motivation alone reached the same significance level. This cannot be accepted as an appropriate test of the ability x motivation interaction, however, since, as mentioned previously, the product is not the same as the interaction, and no multiple regression analyses were performed (Cohen & Cohen, 1975, p. 295).

Studies using the VIE theory of motivation, then, have generally not been supportive of the interaction of ability and motivation in the prediction of performance.

Comments on Past Ability/Motivation Research

On the whole, the research review just presented shows some limited support for the hypothesis that performance is a function of the interaction of ability and motivation. More important, perhaps, is that several issues are raised by an examination of past studies that can provide some direction for future research.

The first two issues have to do with measurement. Ability was defined in a multitude of ways in the research, some of which are

undoubtedly confounded with motivation and other variables. To test the ability x motivation interaction hypothesis, it would seem preferable to use the term ability to refer primarily to relatively stable, long-term non-motivational aptitudes of individuals. By this definition, ability was most highly correlated with performance when it was measured by an aptitude test that was closely related to the task being performed (Arvey, 1972).

Dunnette (Note 4) found similar results with clerical task performance and a weighted composite of three 5-minute clerical tests. In a re-evaluation of a series of laboratory studies, he discovered that when subjects were changed from incentive pay to hourly pay, the impact of ability differences changed from accounting for about 60% of the variance in performance under incentive conditions to, in some cases, none at all under hourly pay. Dunnette argued from his findings that ability is the most parsimonious basis for predicting job performance, since motivation conditions accounted for a small percentage of the variance in performance. His results seemed to indicate that as motivation changes, it primarily affects the expression of ability, and he argued that the ability x motivation interaction is possible only where motivation levels are optimal. On the basis of his research, this appears to be when incentive pay (which can be conceptually equated with instrumentality in VIE theory) and feelings of equity are operative.

Dunnette's (Note 4) research not only supported the importance of relevant ability measures but led to his recommendation of

simplicity as a goal for measures of motivation. This measurement issue was apparent in the research reviewed here. Several researchers using complex VIE formulas for motivation found that weighting instrumentality by valence was ineffective (Arvey, 1972; Gavin, 1970; Lawler and Suttle, 1973; Sheridan et al., 1974). In fact, Lawler and Suttle (1973) argued that it is probably better to use simple expectancy attitudes in measuring motivation rather than the complex VIE formulations, since they found that the total VIE model was not significantly better at predicting performance than was expectancy or instrumentality alone.

A third issue raised by the preceding literature review has to do with the way in which ability and motivation may relate to performance. Studies often showed the main effect of ability, motivation or both, and even the studies effectively demonstrating an interactive effect showed main effects of both variables as well (Fleishman, 1958; French, 1957, 1958; Lawler, 1966). This is contrary to Vroom's statement that "The effects of ability and motivation on performance are not additive but interactive " (Vroom, 1964, p. 203). It would appear that future research should look at both the main effects and the interactive effects of ability and motivation on performance.

While analysis of variance designs can show both main effects and interaction effects, what they cannot show is the importance of the interaction of ability and motivation relative to an additive combination of the two variables in the prediction of performance. Appropriate statistical analyses are, in fact, a fourth issue raised

by previous research in this area. What analysis of variance does not show (effects size and usefulness), multiple regression techniques can show by representing all sources of criterion variance as independent variables (Cohen & Cohen, 1975, p. 206). Multiple regression has the additional advantage of being able to use the full range of data, rather than having to lose metric precision and statistical power by grouping scores together. Individual difference data are to a large extent thrown away by the groupings required in analysis of variance designs (and by designs where continuous variables are categorized to accommodate dummy variable regression).

Although many of the VIE studies did use multiple regression techniques, there seemed to be a misunderstanding on the part of many researchers as to how to test the effects of the interaction of ability and motivation on performance. Following Cohen and Cohen (1975, p. 295) the following clarification is offered.

Let A = ability, M = motivation, and P = performance. Following analysis of variance terminology, $A \times M$ = the ability by motivation interaction. In contrast, let AM = the product of ability and motivation. Then:

$$A \times M = AM.A.M$$

or, the ability x motivation interaction equals the ability x motivation product with ability and motivation partialled out. Only when A and M have been linearly partialled from AM does it, in general, become the interaction independent variable of interest. Linear transformations of A and/or M will change the correlation of AM with P, but AM is not the interaction, $AM.A.M$ is. The correlation of

AM.A,M with P does not change with linear transformations of A and M.

The most appropriate way to test for the significance and relative usefulness of the ability x motivation interaction in the prediction of performance is by hierarchical multiple regression. If the product AM is entered into the regression equation after A and M have already been entered, it is automatically being entered as AM.A,M, which can be interpreted as the A x M interaction. Darlington (1968) has defined the usefulness of a term in multiple regression as the amount R^2 would drop if it were removed from the regression equation and the weights of the remaining predictor variables were then recalculated. Hence an F test for the increment in variance accounted for (McNemar, 1962) is recommended to test whether the interaction term contributes significantly to the prediction of performance over that accounted for by ability and motivation alone (Cohen & Cohen, 1975; Kerlinger & Pedhazur, 1973).

Misinterpretations of the use of multiple regression abound in the VIE research reviewed. Galbraith and Cummings (1967) did not partial out the main effects from their product terms in multiple regression, and Mitchell and Nebeker (1973), Dachler and Mobley (Note 3), Lawler and Suttle (1973), and Sheridan et al. (1974) drew conclusions from the product term in simple regression. With multiple regression, neither Dachler and Mobley (Note 3), Lawler and Suttle (1973), nor Mitchell and Nebeker (1973) performed a significance test to see if the interaction of ability and motivation made a useful contribution to the multiple R. Gavin (1970), Heneman (1971), and Arvey (1972) used

the appropriate statistics, but the first two authors' efforts were impeded by the lack of predictability from their ability tests. Unfortunately for the purposes here, Arvey was primarily interested in motivation and tested for the significance of adding ability (which had a large correlation with performance) to motivation in a multiple regression equation, rather than for the significance of adding motivation to ability in the prediction of performance.

Although the evidence accumulated so far is suggestive, it does not appear that the hypothesis that performance is a function of ability x motivation has as yet been properly tested. An appropriate test of the hypothesis would seem to require:

1. An ability test measure relevant to the task.
2. A simple measure of motivation.
3. A moderated multiple regression design that eliminates no data by categorization.
4. A test of the increment in prediction provided by the ability x motivation interaction beyond that made from their sum.

In the next chapter, some research is reviewed that relates to the second requirement mentioned above--the construct of motivation.

CHAPTER II

INTRINSIC AND EXTRINSIC MOTIVATION

The ability x motivation research is inconsistent with respect to what is meant by motivation. Although a variety of motivating circumstances can be described, one differentiation which appears useful is a distinction between intrinsic and extrinsic motivation. Although these two types of motivation are frequently labelled separately, they are not always consistently defined.

Believing that there is confusion in the motivation literature between intrinsic and extrinsic outcomes (rewards and punishments that are a part of motivation), Dyer and Parker (1975) mailed questionnaires to a random sample of 200 Fellows and members of the Division of Industrial and Organizational Psychology of the American Psychological Association. Respondents were asked to define intrinsic and extrinsic outcomes, and to classify 21 outcomes selected from the motivation literature as intrinsic, extrinsic, either intrinsic or extrinsic, or "not sure". A content analysis of the 93 responses indicated a substantial lack of agreement among definitions.

Intrinsic outcomes were defined by 35% of the respondents as (a) those deriving from the task itself, or associated with the content of the task or job; 25% defined them as (b) outcomes that are internally mediated, self-administered, or self-reinforcing; 14% defined them as (c) subjective outcomes in the form of feelings; and 8% defined them as (d) satisfying higher order needs, such as ego, esteem, or self-actualization. There was somewhat more consistency

in definitions of extrinsic outcomes, since 45% defined them as deriving from the environment surrounding the work, or associated with the context of the task or job, and 24% defined them as outcomes that are externally mediated by the organization or agents of the organization. The classifications of the outcomes presented in the questionnaire also showed much confusion among respondents.

One problem with the Dyer and Parker (1975) study that appears to add to the confusion is that they sought definitions of intrinsic and extrinsic outcomes, not intrinsic and extrinsic motivation. It is suggested here that outcomes are more ambiguous in terms of intrinsic or extrinsic classification than are types of motivation. For example, "responsibility" was categorized as an intrinsic outcome by 55% of the respondents, extrinsic by 13%, either intrinsic or extrinsic by 30%, and "not sure" by 2%. As an outcome, responsibility could satisfy higher order needs (intrinsic) and still be administered by others (extrinsic). Yet if one behaved on a job perceived as responsible in a way that satisfied one's higher order needs, it is speculated that there would be much more agreement that this is intrinsic and not extrinsic motivation.

There is no doubt, however, that intrinsic and extrinsic motivation as well as intrinsic and extrinsic outcomes are confused in the literature. To examine why this confusion has come about and how it can be reconciled, some review of the literature is necessary. Since the two primary definitions of extrinsic outcomes in the Dyer and Parker (1975) study were essentially antithetical to the first two definitions of intrinsic outcomes, the following discussion will center on their four definitions of intrinsic outcomes.

Two-Factor Theory's Dichotomy

Two-factor theory (Herzberg, Mausner, & Snyderman, 1959; Herzberg, 1966) began as a study of job attitudes with the purpose of exploring what people want from their jobs. Interview data of critical incidents showed that the primary determinants of good feelings about the job were achievement, recognition, work itself, responsibility and advancement--factors which were called "motivators" since they were associated with self-reported improvement in performance. On the other hand, bad feelings on the job were associated primarily with company policy and administration, supervision-technical, salary, interpersonal relations--supervision and working conditions--factors called "hygienes" since they seemed to serve primarily to prevent job dissatisfaction rather than to create positive job attitudes. The motivators seemed to surround the theme of job content, and have been equated to intrinsic job factors--definition (a) from Dyer and Parker (1975). The hygienes concerned the context or environment in which individuals do their jobs and were labelled extrinsic job factors.

Two-factor theory has been researched primarily as a theory of job satisfaction rather than of motivation. The two hypothesized unipolar continua, one for job satisfaction and the other for job dissatisfaction, generally are not found unless the original storytelling and coding methods are used (cf. Howard, Note 5). Yet research results have frequently pointed to the greater importance attached to intrinsic rather than extrinsic factors for both satisfaction and dissatisfaction, and some similar results have also been found for motivation.

For example, in the original study, Herzberg et al. (1959) found that respondents claimed a generally positive performance effect in 73% of the periods of good feelings on the job when motivators were predominant. In the critical incidents involving bad feelings, where hygienes were more often mentioned, there was a generally negative effect on performance 48% of the time. That a 48% negative response means there are no motivation implications and a 73% positive response means there are motivational implications has been seriously questioned (Schwab, DeVitt, & Cummings, 1971), but a stronger impact of intrinsic factors as opposed to extrinsic factors is still suggested.

In addition to the Herzberg-type interview method, Atchison and Lefferts (1972) asked 122 active and terminated Air Force pilots how they reacted to the good and bad events they described in terms of both performance and career intent. In the good job sequences, significantly more individuals noted a positive effect for performance than for career intent. In the bad job sequences, less than 50% indicated a negative effect on performance, while significantly more pilots indicated a negative effect on career intent. The authors concluded that the data supported the idea that Herzberg's motivators or intrinsic factors have a closer relationship to the decision to produce and the hygienes or extrinsic factors are more closely related to the decision to participate.

Some very limited support for the motivational characteristics of job content factors comes from a Soviet study of 2665 workers under age 30 in Leningrad (Zdravomyslav & Yadov, 1964). The workers ranked various job factors on a satisfaction questionnaire. When the rankings were compared with supervisory performance ratings, the highest correlation with performance was satisfaction with the nature of the work.

Gordon (1965) had 683 life insurance agents rate their degrees of satisfaction with 54 items and report their production rates. There were positive relationships between satisfaction with intrinsic factors and production, but no relationships between extrinsic or hygiene factors and production. Although self-reported performance data are less than ideal (and Gordon's study is similar to Herzberg et al.'s 1959 study in this respect), the results do give some support to the idea that it is primarily the intrinsic job factors which are associated with performance.

Wernimont, Toren, and Kappel (1970) conducted a questionnaire study in one company where 775 technical employees were asked to rank 17 variables for importance with respect to two aspects of their work lives, one of which was importance in making them want to put extra effort into doing their jobs. Although individual differences were clearly in evidence, there tended to be agreement in the ranking of the three most important variables leading to increased job effort. All of these were intrinsic factors--doing the kind of work one likes to do, being responsible and accountable for all or nearly all of one's aspects of job assignments, and having the opportunity to take part in making the decisions that affect one's work.

Some evidence for both the separation of intrinsic and extrinsic factors and their relationship to performance was presented in two studies by Friendlander. In the first study (Friendlander, 1963), the attempt was made to establish the factorial independence of intrinsic and extrinsic factors in terms of employees' sources of job satisfaction. The sample consisted of 200 engineers, 200 supervisors, and 200 salaried

employees from a large manufacturing company. When 17 source-of-satisfaction items were correlated and factor analyzed, three factors emerged--social and technical environment (including aspects of supervision, work group and working conditions), intrinsic self-actualizing work aspects, and recognition through advancement. The results of the first two factors seemed to correspond to Herzberg's hygienes and motivators, but the third factor seemed to combine hygienes (merit increases) and motivators (promotion and recognition). This deviation from Herzberg's definitions reflects some of the confusion in classifying outcomes reported by Dyer and Parker (1975) and will be commented on later.

Questionnaires scored on the above factors were used by Friedlander (1966) on a sample of 1047 white-collar and 421 blue-collar workers performing primarily research and development activities in an isolated government community. The purpose of the research was to compare the job performance (measured by salary adjusted for tenure) of those scoring high on each of the three factors. Results showed that within the white-collar group the need for achievement through task involvement (intrinsic self-actualizing work) was related to high performance, while the need for achievement through recognition and advancement was related to poor performance. There were no significant factor score differences between high and low performing blue-collar workers. For at least one sample, then, the presence of intrinsic job factors was related to high performance.

The research with two-factor theory and motivation is surprisingly sparse in light of the abundance of studies testing it as a theory of

job satisfaction (cf. Howard, 1974) and the original claim that one group of factors are "motivators". Although the measures used were often poorly designed, the few studies reported here are generally positive in finding intrinsic factors more related to motivation or performance than extrinsic factors.

Two-factor theory's motivators and hygies are functional labels--the motivators supposedly serve to motivate, or cause job satisfaction, while the hygies prevent dissatisfaction but do not satisfy or motivate. When the motivator and hygiene terms were retranslated into intrinsic (job content) and extrinsic (job context) factors, however, some ambiguity arose. For example, why is recognition considered part of job content? Does it not require behavior on the part of at least one individual other than the job performer? And what distinguishes recognition, supposedly an intrinsic job content factor, from interpersonal relations--supervision, an extrinsic job context factor?

Some cognizance of this problem and progress toward its solution came from Schneider and Locke (1971), who separated critical incidents into events (what happened) and agents (who made it happen). Their study showed that the same categories of events were judged to lead to both good and bad days on the job, but self was the primary agent involved in good days and other agents in bad days. Their categorization leads to Dyer and Parker's (1975) second definition of intrinsic outcomes as those administered by the self (and extrinsic outcomes as those administered by others). Under this definition recognition and advancement seem to be more extrinsic than intrinsic factors, contrary to Herzberg's definitions. The second definition also agrees with that used by many VIE theorists.

Differentiation of Types of Motivation in VIE Theory

Although most studies of the VIE theory of motivation have concentrated on extrinsic rewards and hence extrinsic motivation (Deci, 1975), several VIE theorists have included a distinction between intrinsic and extrinsic motivation in their VIE models (cf. Galbraith & Cummings, 1967; Graen, 1969; House & Wahba, 1972). Extrinsic rewards, as defined in most VIE research, refer to externally mediated rewards, or rewards distributed by someone other than the self. For example, the organization can provide money, fringe benefits, or promotions; the supervisors may provide recognition or supportive behavior; and the peer group may provide acceptance. For these rewards to contribute to motivation, they must be contingent upon effective work performance; i.e., multiplied by an instrumentality term. Intrinsic rewards, on the other hand, appear to be self-rewards and internally mediated. They may or may not require an instrumentality term or an expectancy term according to different theorists.

Several studies using the VIE theory of motivation have pointed to the importance of intrinsic motivation, as did the Herzberg research. In a test of the various kinds of VIE variables, Lawler and Suttle (1973) measured 18 performance-outcome expectancies, 18 effort-outcome expectancies, and 2 effort-performance expectancies. A factor analysis of the 38 expectancy items showed three interpretable factors. These were defined not by type of expectancy but by type of outcome or reward. The first factor included items concerned with internally mediated rewards, the second with externally mediated rewards, and the third with negatively valued outcomes. The internal factor cor-

related .64 with effort-performance expectancy, while the external and negative factors showed no significant correlation with this same expectancy. The internal factor was also the only factor to correlate significantly with rank of effort by self ($r = .32$, $p < .01$). This was almost as high as the correlation of the total VIE model with rank of effort by self ($r = .39$, $p < .01$), and demonstrates that the internal motivation factor was carrying the weight of the motivation model.

The instrumentality term in VIE theory implies that rewards must be contingent upon performance. Since self-administered rewards for good performance are usually positive feelings about the self, there is a logical connection to Dyer and Parker's (1975) definitions (c) intrinsic outcomes affect subjective feelings, and (d) intrinsic outcomes satisfy higher order needs. VIE research has also used these definitions.

Lawler (1969) defined intrinsic motivation as the degree to which a job holder is motivated to perform well because of some subjective rewards or feelings that he expects to receive or experience as a result of performing well. Intrinsic motivation was measured directly by four items in a study of 291 scientists in 22 research and development laboratories (Lawler & Hall, 1970). The items were:

1. When I do my work well, it gives me a feeling of accomplishment.
2. When I perform my job well, it contributes to my personal growth and development.
3. I feel a great sense of personal satisfaction when I do my job well.
4. Doing my job well increases my feeling of self-esteem.

Intrinsic motivation was correlated with self-rated effort ($r = .18$, $p < .01$) and with self-rated performance ($r = .11$, $p < .05$). No contrast with extrinsic motivation was made in this study, however.

Mitchell and Albright (1972) hypothesized that job satisfaction, job effort, and job performance would be more related to intrinsic factors than to extrinsic factors. Their subjects were 51 naval aviation officers, and effort and performance were rated on a CO/XO rating form used by higher officers. Intrinsic outcomes included feelings of self-esteem, opportunity for independent thought and action, opportunity for personal growth and development, feeling of self-fulfillment, and feeling of worthwhile accomplishment. (The expression "opportunity for" appears to muddle the classification of an outcome as externally mediated, since others can provide the opportunity, but it is the self that grows or develops.) Extrinsic outcomes were authority, prestige, security, opportunity to develop close friendships, salary, promotions, and recognition. When the VIE motivational variables were correlated with self-rated effort and superior-rated performance, almost every comparison showed that the intrinsic components were equally or more related to the criteria than the extrinsic components. But it should be noted that differences between correlations for the two types of motivational variables did not reach statistical significance.

Type of outcome was also separated in a study of 50 male undergraduates by Mitchell and Nebeker (1973). Three intrinsic outcomes included feelings of accomplishment, self-confidence, and appreciation of ideas. Two extrinsic/impersonal outcomes included a good job and admission to graduate school. Four extrinsic/social outcomes included

social attractiveness to the other sex, social attractiveness to the same sex, parental praise, and respect from peers. When valences and instrumentalities for these outcomes were separated, the intrinsic factors were most valued, but the extrinsic/impersonal outcomes were perceived as most attainable from college performance. Both types of factors could presumably be motivating, then.

The VIE studies just reviewed have at least two implications. First, intrinsic motivation, mostly ignored by VIE theorists initially, appears to have promise as a motivator and should be considered. Second, definitions of intrinsic and extrinsic outcomes are not always the same within the same theoretical network. The definition problem leads to yet another motivation theory for clarification.

Cognitive Evaluation Theory

Perhaps the best integrated definition of intrinsic motivation comes from Deci's (1975, 1976) cognitive evaluation theory. He noted that in the experimental literature, behavior is defined as intrinsically motivated when there are no apparent external rewards. While this may be an effective operational definition for experimental studies, it does not provide a meaningful account of the processes that underlie these behaviors. Deci suggests instead that intrinsically motivated behaviors are those involved with the human need for being competent and self-determining. Intrinsically motivated behaviors fall into two classes--those that people engage in to seek out optimally challenging situations and those whose aim is to conquer challenge or reduce incongruity.

White (1959) presented the strongest early paper that posited a motivation for competence or effectance motivation. Rather than reducing a tissue drive, competence motivation is energized by the need to deal effectively with the environment and causes behaviors which allow a person to have feelings of efficacy.

Deci (1975, 1976) hypothesized that a sequence of motivated behavior begins with stimulus inputs to the central nervous system-- from the environment, from memory, or from internal stimulation. The stimulus inputs generate an "awareness of potential satisfaction". This, in turn, provides the energy for an individual to decide what to do, to set goals, and to behave in such a way as to try to achieve these goals. The reward is the feeling of competence and self-determination from dealing with one's environment. The activity itself cannot be its own reward or reinforcer; it can only bring about internal consequences which the individual perceives as rewarding.

Cognitive evaluation theory would encompass all four major classifications of intrinsic outcomes in the Dyer and Parker (1975) study, then. Logically, intrinsic motivation should come from the content rather than the context of a job, and the individual rewards himself with feelings of competence and self-determination.

Scott (1976) has criticized Deci's theory from a behavioristic point of view. He suggested that when behavior is seen to persist in the absence of conventional reinforcers, it would be more fruitful to look for less obvious response-contingent stimulus events known to have reinforcing properties than to hypothesize about a number of autonomous central processes. Deci's (1976) major reply to Scott was that the two of them begin with different metatheoretical assumptions.

Scott subscribes to the assumption that human beings are mechanisms whose behavior is determined by reinforcement histories and contingencies in the present environment. Deci starts with the assumption that internal states such as motives, feelings, and attitudes are causes of behavior, not epiphenomenal to it. Cognitive evaluation theory assumes that humans are information processors who make decisions and behave in accord with those decisions.

Deci did not deny that there is a large quantity of evidence that extrinsic rewards or reinforcers motivate behavior. He did argue, however, that there are situations in which the use of extrinsic rewards will decrease intrinsic motivation, change attitudes, and impair performance.

According to cognitive evaluation theory, extrinsic rewards affect intrinsic motivation by two processes. First, when behavior is intrinsically motivated, the perceived locus of causality is said to be internal; that is, the cause of certain behavior is thought to be one's own intrinsic needs. When people receive extrinsic rewards, their perceived locus of causality becomes external, and they perform the behaviors only for extrinsic rewards (extrinsic motivation) and no longer because they are intrinsically motivated. This hypothesis draws on the work of deCharms (1968), who suggested that when external rewards are given for an intrinsically motivated activity, the individual's feeling of personal causation shifts so that he feels he has become a pawn to the source of external rewards. Festinger similarly reasoned from his theory of cognitive dissonance (1957) that external rewards affect the person's concept of why he is working and his attitudes toward work and thus decrease intrinsic motivation.

Cognitive evaluation theory specifies that a second way intrinsic motivation may be affected by extrinsic rewards is through a change in feelings of competence and self-determination. If rewards convey to people that they are competent and self-determining, their intrinsic motivation is increased; if rewards convey the opposite, intrinsic motivation is decreased.

The contention of cognitive evaluation theory that extrinsic rewards may have detrimental effects on intrinsic motivation was derived from a number of studies which have generated some controversy.

The Impact of Extrinsic Rewards on Intrinsic Motivation

A series of studies by Deci (1971, 1972a, 1972b, 1975) demonstrated with some success the detrimental effect of extrinsic rewards on intrinsic motivation. The studies all used the same basic paradigm of observing subject behavior in three different periods. During the first period Ss were performing at an operant level for no apparent external reward, during the second period Ss were rewarded for the activity in the experimental group while control Ss received no reward, and finally the rewards were halted, and the subjects were given a free choice of activities while being unobtrusively observed.

The bulk of Deci's evidence comes from laboratory studies, where the task was putting together a puzzle of plastic pieces according to configurations drawn on paper. Intrinsic motivation was measured by amount of time spent working on the puzzles for [time 3 - time 1]. Intrinsic motivation was compared for the experimental and control groups to measure the effect of the reward/no reward condition of the second period. In two studies where money was used as a reward, one

of them showed a significant decrease in intrinsic motivation following the extrinsic reward, providing the money was received after the total experiment was finished and could not contribute to inequity dissonance reduction (Deci, 1972b). A similar laboratory study (Deci, 1972a) showed that money decreased intrinsic motivation only when it was contingent on number of puzzles done, rather than a fixed fee for participating.

The contingency requirement for extrinsic rewards to reduce intrinsic motivation has been questioned by Calder and Staw (1975a, 1975b), who demonstrated that a noncontingent monetary reward could lead to decreased task satisfaction among subjects working on jigsaw puzzles. Kruglanski, Freedman, and Zeevi (1970) also found that a noncontingent reward (the promise of an interesting laboratory tour to high school students for participating in an experiment) decreased recall, creativity, and satisfaction with the experimental task. The contingency of extrinsic rewards may be important only in that it affects their saliency, then (Calder & Staw, 1975a).

An experiment using Deci's laboratory paradigm with positive verbal reinforcements showed that intrinsic motivation was higher for experimental subjects than controls after introduction of the rewards (Deci, 1971). This proved to be true only for males, however (Deci, 1972b; Deci, Cascio, & Krusell, 1975), and was attributed to increasing their feelings of competence. The intrinsic motivation of females was reduced after positive verbal reinforcements, presumably because they detected a change of locus of causality from self to others, consistent with the socialization of females.

Negative verbal reinforcements were found to have significant negative effects on the intrinsic motivation of both males and females in about the same degree in the same type of puzzle design. In addition, negative feedback through failure, without verbal feedback, also resulted in the experimental subjects playing significantly less with the puzzles during the free play period than did a control group (Deci, 1975).

Salancik (1975) argued that Deci's findings vary with level of difficulty of the task, and demonstrated his hypothesis in an experiment with 78 male undergraduates performing a slot-car road-racing task. Error rates were markedly increased for one group by varying the amount of power sent to different parts of the track. Results showed no difference in task persistence for the pay vs. no pay groups, but high performers persisted longer than low performers. These results could also be interpreted as the detrimental impact on intrinsic motivation of negative feedback through failure, however.

Lepper, Greene, and Nisbitt (1973) demonstrated that intrinsic motivation could be undermined with extrinsic rewards in a study of preschool children who had demonstrated interest in drawing with magic markers. The children were blocked by degree of initial interest and randomly assigned to one of three conditions: 18 Ss in the expected award condition (the reward being a certificate with a gold seal and ribbon), 18 Ss in an unexpected award condition (the children did not know they would get the award until after they had drawn their pictures), and 14 Ss in a no award condition. As predicted, the children in the expected award condition spent less time playing with the drawing materials in post-experimental

measurement sessions than did children in the other two conditions.

The Lepper et al. (1973) study was replicated by Greene and Lepper (1974). Combining the two studies, 93% of the no award children and 89% of the unexpected award children subsequently played with the magic markers in their classrooms, while only 62% in the expected award groups did so. Two additional experiments with different tasks (puzzles and math-related activities) and different rewards (the chance to play with some highly attractive toys and the chance to earn credits toward math program awards, respectively) showed similar results (Greene & Lepper, 1974).

Noting that both the Deci and the Lepper et al. studies showed significant results only with highly salient or expected rewards, Ross (1975) demonstrated this point further with two samples of nursery school children enticed to play a drum. Compared to children promised a prize located under a box in front of them (salient reward condition), a much greater proportion of children promised an unidentified prize or no prize chose initially to play with the drum in a free play period, played with the drum longer (even when measured four weeks later), and were much more likely to identify the drum as the "most fun thing in the room". In a second experiment, children who were either asked to think about a topic unrelated to the reward or offered no reward displayed more interest in playing the drum later than did children asked to think about the reward of two marshmallows. Again, results showed that high salience of extrinsic rewards makes them even more likely to diminish intrinsic motivation.

Reiss and Sushinsky (1975) performed two experiments that showed that the "decreased play" phenomenon appeared to occur with single-

trial rewards, but the opposite effect occurred when contingent reinforcements were applied in multiple trials. Reiss and Sushinsky's (1976) explanation of their results (as well as those where extrinsic rewards appeared to undermine intrinsic motivation) was that there are competing responses that interfere with task enjoyment. Performance anxiety, frustrative delay of reward, embarrassment or guilt if the reward is perceived as socially inappropriate, rushing to finish to obtain a reward, and visual and cognitive distraction may all be competing responses. Since arousal of most of these competing responses should generally be greatest when the reward is first introduced, Reiss and Sushinsky (1976) argued that many decreased play effects are stimulus novelty effects that weaken over repeated trials of rewards contingent on performance.

In response to this argument, Lepper and Greene (1976) stated that competing responses are neither necessary nor sufficient antecedent conditions for decrements in subsequent engagement in activities of initial interest. Moreover, the Lepper et al. (1973) studies began with a baseline of intrinsic interest and had nothing to do with the learning or acquisition of intrinsic interest.

The studies demonstrating that extrinsic rewards may undermine intrinsic motivation are indeed controversial. Yet neither Lepper and Greene nor Deci make exaggerated claims that extrinsic rewards are always detrimental to intrinsic motivation. Extrinsic rewards may be especially valuable when level of intrinsic interest is low and the extrinsic reward induces involvement or brings the person to a meaningful level of mastery on the task (Lepper et al., 1973). In a similar vein, Deci (1972a) argued that organizations should use money, an

extrinsic reward, to attract and keep employees on the job, but that participation and job enlargement should be used to arouse intrinsic motivation to perform the job. Another implication of these studies for organizations, providing results are generalizable, is that reward systems should be examined to see that they do not simultaneously increase extrinsic motivation and decrease intrinsic motivation.

A Preference for Studying Intrinsic Motivation

The preceding discussions of research with two-factor theory and VIE theory suggests that intrinsic motivation is a subject worthy of study in its own right. Although there is still much confusion in definitions, cognitive evaluation theory offers an integrated approach for studying intrinsic motivation. Finally, the research on extrinsic rewards and intrinsic motivation implies that intrinsic motivation is important enough that the threat of its being undermined by extrinsic rewards is considered highly undesirable.

It is not contended here that extrinsic rewards or extrinsic motivation are not important. There is too much evidence in the psychological literature on the effects of reinforcement to entertain that idea. What is suggested is that intrinsic motivation may be the more valuable construct to study in an ongoing organization. Although extrinsic rewards are certainly available in organizations (people are paid to work, their supervisors reward them verbally, they get promoted, etc.), on a day-to-day basis under conditions of no incentive pay, the enhancement of intrinsic motivation may be the most reliable motivator at an organization's disposal.

Deci (1975) has suggested that whether or not extrinsic rewards are appropriate depends on what the rewarder is attempting to do. If one is trying to get someone to do something on a one-time basis, extrinsic rewards are the more efficacious. Extrinsic reward systems can be highly effective as long as the system remains operative; that is, the rewards never stop, they are contingent on performance, performance is measured precisely, controls are always in force, and the relationship between performance and rewards is clearly spelled out. Yet even under these conditions, Deci warns that individuals may become more concerned with the rewards than with the activity and spend their energy trying to obtain the most rewards for the least effort.

If, on the other hand, one is more interested in increasing and maintaining motivation than in increasing immediate performance, intrinsic motivation may be the preferable approach. Greene and Lepper (1974) suggested there may be a trade-off between the immediate success and the long-range consequences of reward systems, with powerful and salient extrinsic rewards being more effective as long as the reward system is in operation. The more powerful and salient the rewards, however, the more likely they are to undermine intrinsic motivation in the absence of these rewards.

Others have suggested from a slightly different vantage point that intrinsic motivation may be the preferred way to stimulate employee performance. Porter, Lawler, and Hackman (1975) warned that there are some serious dangers involved in the leadership strategy of using concrete rewards and punishments to get subordinates to do one's bidding. When interpersonal rewards are used, there is the risk that at some point in time subordinates will have had enough, and interpersonal favors

will no longer be motivating. Moreover, relationships between leaders and subordinates may suffer when there is too heavy a reliance on the administration of rewards and punishments as motivational tools. This places adults in a highly dependent relationship with another whom they must please in order to have valued rewards dispensed to them--a situation with potentially dysfunctional consequences such as hostility, withdrawal, and sabotage (Argyris, 1957).

Regardless of whether or not intrinsic motivation is the preferred way to stimulate performance in the organizational environment, it represents a new and desired way to examine the relationship of ability and motivation. The next chapter explores how intrinsic motivation may be determined both by organizational strategies and individual characteristics.

CHAPTER III

THE DETERMINANTS OF INTRINSIC MOTIVATION

Organizations assume somewhat different roles in the facilitation of intrinsic vs. extrinsic motivation. Extrinsic rewards are tangible, potentially visible to others, and given by members of the organization to others. Intrinsic motivation can be enhanced by the organization only by creating conditions that make it possible for individuals to experience the appropriate self-administered rewards. This is accomplished by means of particular job designs (Porter, Lawler, & Hackman, 1975).

Job Design

Studies of job enrichment have essentially made the argument that job modifications are fundamental steps toward increasing the motivation of workers. Lawler (1969) summarized ten job enlargement studies, all of which resulted in higher quality work; four of the ten also showed that job enrichment led to higher productivity. Lawler suggested that individuals probably achieve more satisfaction from producing one very high quality product than from producing a number of low quality products.

Theoretical explanations for the impact of job enrichment have been offered by McGregor (1960), Argyris (1964), Likert (1967), and Herzberg (1966). Specific recommendations generally involve job changes such as (a) providing more challenging elements, (b) allowing workers to inspect their own output (feedback), (c) making workers more responsible for

their own jobs, and (d) enlisting workers' participation in decisions affecting their work. The relative contributions of the individual recommendations have not been exactly determined.

Hackman (1969) argued that tasks have four points of impact on the performance process. First, the characteristics of the task lead to hypotheses and intentions about how to respond to it. The task also affects motive states, such as arousing the need for achievement. Level of cognitive or physiological arousal is affected by the complexity, uniqueness, or variety of the job. Finally, the task helps establish process-outcome links; that is, after the performer has engaged in some work activities and gotten feedback, he/she perceives which kinds of behaviors lead to which kinds of outcomes.

Lawler (1969) also specified some properties of tasks that would be likely to arouse motives like achievement and to generate the belief that successful performance will result in positive feelings of achievement and growth. Such jobs were said to be characterized by (a) feedback, which may be particularly prominent when the job involves working on a whole product, (b) use of valued abilities, and (c) control by the worker over the setting of goals and defining the paths to those goals.

The relationship between task characteristics and achievement motivation, one type of intrinsic motivation according to Deci (1975), seems to be a critical one. Research has suggested that achievement motivation is most likely to be aroused by moderately challenging tasks (those where there is about a 50-50 chance of success), in competitive situations, in situations where performance is perceived to depend on some important or valued skills, and where performance feedback is given (Lawler, 1973). But achievement motivation typically is not activated

when people are performing routine or boring tasks, or when no competition is involved (Lawler, 1973).

Lawler and Hall (1970) researched the relationship between various job characteristics and intrinsic motivation among 291 scientists in 22 research and development laboratories. Four items reflecting intrinsic motivation were correlated (at $p < .01$) with the following: "My job gives me a chance to be creative" ($r = .15$), "My job gives me a chance to do the things I do best" ($r = .16$), and "My job is appropriate for my abilities" ($r = .18$). Opportunities for control and influence provided by the job were not related to intrinsic motivation.

Hackman and Lawler (1971) went to a greater level of specificity and identified particular job design factors that would produce various organizational and personal outcomes. Drawing on the work of Turner and Lawrence (1965), they proposed four requisite task attributes, or core dimensions of jobs, that they felt were critical to enhance the intrinsic motivation of workers:

1. Autonomy allows the worker to feel personally responsible for a meaningful portion of his work, so that what is accomplished must be through the worker's own efforts. Without autonomy, a worker may feel that successes and failures are due to the work of other workers or supervisors.

2. To experience positive feelings about himself, the worker must feel that his efforts led to achieving something he personally feels is worthwhile and important. One way is for the job to be a sufficiently whole piece of work. This was called high task identity by Turner and Lawrence.

3. A worker may also feel he is doing something meaningful when

the job requires him to use skills and abilities which he personally values. Opportunities for workers to experience this feeling would be expected on jobs high on the dimension of variety, since such jobs typically tap a number of different skills which may be important to the employee. The variety must challenge the worker, however.

4. The job must provide feedback about what is accomplished so that the worker will know how he is doing.

Hackman and Lawler (1971) tested the four core dimensions with a sample of 208 employees of a telephone company working on 13 different jobs. Employee reactions to their jobs were measured on a number of dimensions; experienced intrinsic motivation, locus of motivation, job involvement, general job satisfaction, and 12 items reflecting specific job facet satisfactions. Performance was measured by ratings from supervisors on quantity of work produced, quality of work produced, and overall performance effectiveness.

Results showed that the higher the jobs were rated on each of the four core dimensions of variety, autonomy, task identity, and feedback, the higher the intrinsic motivation to perform well (all $p < .05$, one-tailed tests). The data suggested that "doing well" was interpreted as having more to do with high quality performance than producing large quantities of work. Some or all of the core dimensions were positively related to supervisors' performance ratings, attendance, job involvement, overall job satisfaction, and specific job facet satisfactions.

The theoretical underpinnings of the core dimensions imply that for maximum motivation, jobs should be simultaneously high on all four of the dimensions. That is, employees should have the opportunity to find out (feedback) that they personally (autonomy) have accomplished

something meaningful (task identity and variety) when they perform well. To test this hypothesis, subjects were partitioned into three groups-- those above the 60th percentile on all four core dimensions, those (the majority of subjects) who typically described their jobs as high on some of the core dimensions and low on others, and those below the 40th percentile on all four core dimensions. One-way analyses of variance showed significant differences between the groups in the predicted direction on the various dependent variables more substantial in terms of significance levels than the overall correlational results.

Brief and Aldag (1975) attempted a partial replication of the Hackman and Lawler (1971) study with 104 state employees involved in the rehabilitation of inmates. All of the job core dimensions except task identity correlated significantly ($p < .05$) with intrinsic motivation. Moreover, all four job core dimensions had significant correlations with general job satisfaction, job involvement, and satisfaction with work as measured by the Job Descriptive Index (Smith, Kendall, & Hulin, 1969).

Hackman and Oldham (1975, Note 5, Note 6) built upon the Hackman and Lawler (1971) work in their development of the Job Diagnostic Survey (JDS). The theory underlying the instrument proposes that positive personal and work outcomes, such as high internal motivation, high work satisfaction, high quality performance, low absenteeism, and low turnover are realized when three "critical psychological states" are all present within an employee. The psychological states are traced backed to five core job dimensions. Specifically:

1. Experienced meaningfulness of the work is attributed to the core job dimensions of skill variety, task identity, and task significance.

2. Experienced responsibility for outcomes of the work is attributed to job autonomy.

3. Knowledge of the actual results of the work activities is provided by feedback from the job itself.

Four of the five core dimensions are essentially the same as in Hackman and Lawler (1971). The fifth dimension, task significance, was defined as the degree to which the job has a substantial impact on the lives or work of other people, whether in the immediate organization or in the external environment.

Since all three psychological states were considered equally important, a multiplicative function of the five core dimensions as they relate to the three psychological states was postulated to represent a job's Motivating Potential Score:

$$\text{Motivating Potential Score} = \frac{\text{Skill Variety} + \text{Task Identity} + \text{Task Significance}}{3} \times \text{Autonomy} \times \text{Feedback}$$

The JDS also measures two supplementary job dimensions, the critical psychological states, affective outcome measures of motivation and types of satisfaction, and individual difference measures of growth need strength. The measure of intrinsic motivation, which the authors call internal motivation, is defined as "the degree to which the employee is self-motivated to perform effectively on the job; that is the employee experiences positive internal feelings when working effectively on the job, and negative internal feelings when doing poorly" (Hackman &

Oldham, 1975, p. 162). A detailed description of the JDS can be found in Hackman and Oldham (Note 6).

The substantive validity of the JDS was reported for a sample of 658 employees in 62 different jobs in 7 organizations (Hackman & Oldham, 1975, Note 7). Of interest here is that among the seven organizations, the median correlation between Motivating Potential Score and internal motivation was .48 (Hackman & Oldham, Note 7), a significant finding ($p < .01$, combining the p levels for the seven separate analyses). In addition, the same measure of enriched job characteristics correlated significantly with other outcome variables, such as growth satisfaction (median $r = .58$, $p < .01$), general satisfaction (median $r = .43$, $p < .01$), absenteeism (median $r = -.25$, $p < .05$), and rated work effectiveness (median $r = .24$, $p < .01$).

The relationship of job design factors to intrinsic motivation seems to have some support, then. Yet, it is unlikely that job design is the only determinant of intrinsic motivation, and several studies have looked to non-ability characteristics of individuals as additional sources.

Individual Characteristics

Lawler and Hall (1970) felt that intrinsic motivation is probably a function of both the job characteristics and the job holders' characteristics. Some people are more likely to be motivated intrinsically than other people; i.e., those who already have strong desires for self-actualization and self-esteem (the higher order needs of Maslow, 1970) and those with a high need for achievement, which involves competition with a challenging standard of excellence (Atkinson, 1964).

Hackman and Lawler (1971) looked at both higher order needs (from ratings of how much employees would like to have such job characteristics as opportunities for personal growth and development) and the job core dimensions mentioned previously. To test the possibility that subjects differing in higher order need strength would show differential responsiveness to jobs high on the core dimensions, the top 1/3 of Ss on need strength were compared to those in the bottom 1/3 of the same distribution. It was expected that since higher order need strength was generally high for all subjects, the "lows" would still show positive relationships between the core dimensions and the dependent variables, but the relationships would be lower in magnitude than those for the "highs". Correlations of variety, autonomy, and feedback with level of intrinsic motivation, motivational focus of taking personal responsibility, and specific satisfaction items were generally in the predicted pattern.

Again to test their argument that jobs need to be high on all four core dimensions, the product score (variety x autonomy x task identity x feedback) was correlated with the dependent variables separately for the higher order need strength Ss vs. the lower order need strength Ss. The correlation between high core jobs and level of intrinsic motivation was .54 for high need employees and .23 for low need employees (both $p < .05$, $N = 67$ in each group), but the difference between the correlations was not statistically significant. Motivational focus of taking personal responsibility, focus on high quality work, and supervisors' ratings of quality of performance were related to high core jobs only for high need strength employees, but the difference between the correlations for the two need strength groups was not statistically significant. Correlations were significantly higher for the higher need strength subjects

on 8 of 12 specific job satisfaction items. The authors concluded that individuals with strong desires for higher order need satisfaction respond much more positively to high core jobs than do individuals who have weaker higher order needs.

Brief and Aldag (1975) also looked at the moderating effects of growth need strength in their partial replication of the Hackman and Lawler (1971) study. Correlations were calculated between the product of the four core dimensions and each dependent variable for the third of the subjects highest in higher order need strength and the third of the subject lowest in higher order need strength. Brief and Aldag did not find that higher order need strength was a moderator for the dependent variables of intrinsic motivation, general job satisfaction, job involvement, or satisfaction with work.

A study similar to Hackman and Lawler's (1971) was conducted by Wanous (1974) with 80 newly hired female telephone operators. Higher order need strength was measured by a composite score on eight items tapping preferences for variety, autonomy, task identity, task feedback, management feedback, challenge, meaningfulness, and use of valued skills on the job. Employees were split at the median into high or low need strength groups. The presence of task characteristics was also measured on the four core dimensions of feedback, variety, autonomy, and task identity. Employee reactions included satisfaction with specific job characteristics, global job satisfaction, absenteeism, and performance. Classification of employees by Protestant work ethic or by urban/rural background as suggested by Hulin and Blood (1968) did not demonstrate that these individual differences moderate the relationships between job characteristics and either satisfaction, attendance, or performance.

Higher order need strength did moderate the relationship between the four core dimensions and job satisfaction but not the other criteria. Intrinsic motivation was not measured, however.

Robey (1974) was more successful in a laboratory experiment in demonstrating that workers must value job challenge, achievement, and autonomy before job enlargement can have a positive effect on performance. A sample of 126 college students in a management course was administered the work values questionnaire developed by Friedlander (1963). Subjects were classified into treatment groups according to whether their responses indicated an overall preference for extrinsic job aspects or a preference for intrinsic job challenge.

The treatment groups were contrasted with respect to two laboratory tasks, one of which was said to represent a more enlarged job. Those on the unenlarged job (computer group) transcribed data, were specialized, and were interdependent. Those on the enlarged job (hand group) had a more complex task, involved less interdependence, and required more time per problem. Task performance was measured in terms of reduction in number of errors made between the first day and the third day. On the unenlarged job there was no significant difference in performance improvement between the intrinsic and extrinsic preference groups. On the enlarged job the intrinsic group's mean was significantly higher than that of the extrinsic group, whose performance decreased. One could argue from this study, then, that when intrinsic values are present, job designs with some of the characteristics of job enrichment (task complexity, independence) foster better performance.

Hackman and Oldham (1975) did not expect their theory about the Motivating Potential Score of jobs to apply with equal effectiveness

for all individuals. Individuals who strongly value and desire personal feelings of accomplishment and growth were expected to respond very positively to a job high in motivating potential, while individuals who do not strongly have these values might find such a job anxiety-arousing and be uncomfortably "stretched" by it. The authors therefore hypothesized that growth need strength, or desire to obtain opportunities for personal growth and development on the job, would moderate the relationships between their core job characteristics and their postulated positive work outcomes (high intrinsic work motivation, high quality work performance, high satisfaction with the work, and low absenteeism and turnover).

In the test of their theory with 658 employees in 7 organizations (Hackman & Oldham, Note 7), their measure of growth need strength was obtained from the "Job Choice" section of the JDS. Based on scores on this measure, the top and bottom quartiles of employees in each of the seven organizations were identified and correlations with the outcome variables computed. Motivating Potential Score had a median correlation of .52 with intrinsic motivation for the high growth need strength employees and .27 with the low growth need strength employees; the difference between the correlations was statistically significant at $p < .05$. Median correlations between the Motivating Potential Score and growth satisfaction, general satisfaction, absenteeism, and rated work effectiveness were not significantly stronger for the high growth need strength groups than the low growth need strength groups. Growth need strength did moderate the relationship between the Motivating Potential Score and the product of their postulated psychological states, and it moderated the relationship between the product of the psychological

states and internal motivation, general satisfaction, growth satisfaction, and rated work effectiveness, providing further support for the theory. There were no indications that individuals low on growth need strength reacted negatively to complex or enriched jobs, as had been suggested; only that they reacted less positively.

Oldham, Hackman and Pearce (Note 8) followed the same procedure as Hackman and Oldham (Note 7) in a study of 201 clerical employees in 25 different jobs in a large metropolitan bank. The employees were divided into top and bottom quartiles on the basis of growth need strength as measured by the Job Choice section of the JDS. Correlations between Motivating Potential Score and intrinsic motivation for the two groups were not significantly different, however. Growth need strength was a moderator of the relationship between Motivating Potential Score and one of two measures of performance.

It appears, then, that there are two factors which may determine intrinsic motivation. First, a job design which permits the individual to satisfy higher order needs or growth needs. This design may include elements such as autonomy, variety, task identity, feedback, task significance, challenge, responsibility, and the use of important skills and abilities. Second, individuals who already have high growth needs may benefit more by such job designs, so that the interaction or combination of the organizational and individual characteristics should lead to the greatest intrinsic motivation.

CHAPTER IV

PERFORMANCE = f (ABILITY x MOTIVATION) REVISITED

In the preceding chapters it has been argued that increasing motivation should theoretically increase the predictability of performance from ability measures, raise the level of overall employee performance, and increase employee job satisfaction. A review of the research attempting to demonstrate that performance = f (ability x motivation) illustrated that although such an interaction may indeed exist, a complete and proper test of the hypothesis has not as yet been undertaken. An appropriate test, it was argued, would require relevant ability tests, simple motivation measures, a moderated multiple regression design that maximizes use of all data, and a test of the increment in prediction provided by the ability x motivation interaction above that provided by their sum.

A review of intrinsic and extrinsic motivation demonstrated that, for various theoretical and empirical reasons, intrinsic motivation warrants independent study as a factor enhancing the prediction of job performance from ability measures. Determinants of intrinsic motivation were traced to both job designs with "enriched" characteristics and the strength of individuals' needs for growth.

A synthesis of the research and arguments presented in the first three chapters provides a new perspective from which to test the hypothesis that performance is a function of ability x motivation.

Models

The model for the synthesized view of performance determinants tested in this research is presented in Figure 3. The model is not, of course, intended to represent all the determinants of job performance, especially since extrinsic motivation has been omitted.

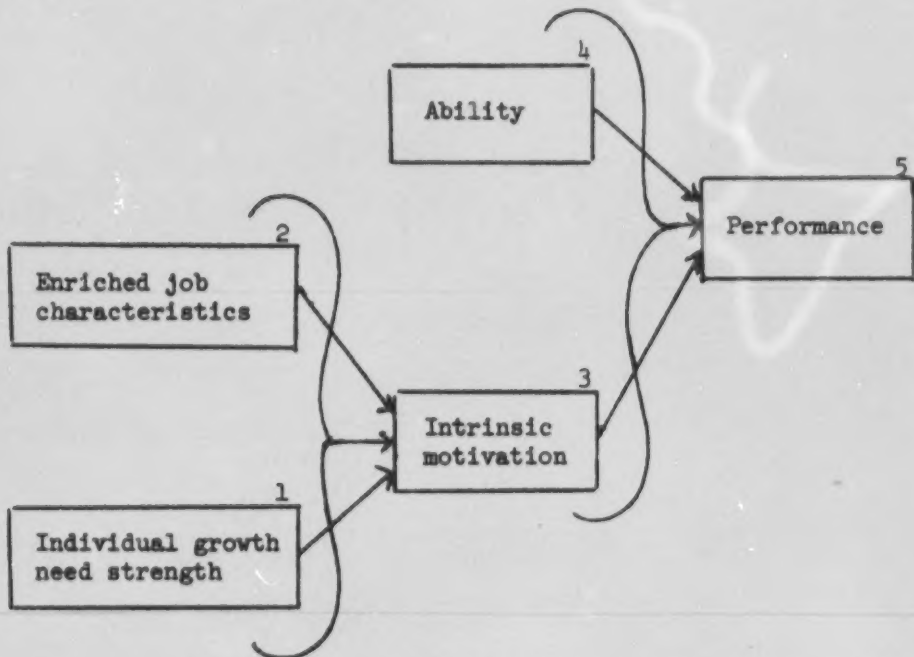


Figure 3. Model of ability and intrinsic motivation factors affecting performance.

Cells 1 and 2 represent the two major determinants of intrinsic motivation as described in Chapter III. Cell 1 represents individual non-ability characteristics, designated here as growth need strength. Cell 2 represents those job design characteristics which are seen as providing the opportunity for employees to use their abilities for meaningful, individual task accomplishment. On such jobs good performance should make it possible to obtain the self-administering intrinsic re-

wards that satisfy the needs in Cell 1.

Cell 3 refers to intrinsic motivation, described in Chapter II as engaging in behaviors that lead to receiving intrinsic rewards such as feelings of competence and self-determination. In the work situation, these behaviors refer specifically to working effectively on the job. The individual desires in Cell 1, the organizational opportunities in Cell 2, and the interaction of Cells 1 and 2 (represented by the brackets) should each lead to intrinsic motivation as represented in Cell 3.

Cell 4, ability, is defined as relatively stable, long-term, non-motivational aptitudes, in accordance with the arguments in Chapter I.

Cell 5 represents individual performance on the job. As seen in the model, performance is predicted from ability (Cell 4), intrinsic motivation (Cell 3), and the interaction of Cells 3 and 4 (represented by the brackets).

Some further elaboration is perhaps required to identify how the motivational constructs formulated here fit with common definitions. Maier (1955) pointed to both a subjective and an objective aspect of motivation. The subjective side was the need, drive, or desire within the individual, defined here in Cell 1. The objective side was considered to be an object outside the individual called the incentive or goal. In Figure 3, the job characteristics in Cell 2 offer the opportunity for accomplishment of a meaningful and worthwhile task. Maier (1955) continued by stating that when the natures of the need and the incentive are such that obtaining the incentive satisfies the need, the situation is called motivating. In Figure 3, successful task accomplishment should satisfy the desire for the internally mediated rewards suggested by Cell 1 and result in the intrinsic motivation noted in Cell 3.

One of the most frequently quoted definitions of motivation is that of M. R. Jones (1955), who stated that motivation is concerned with "how behavior gets started, is energized, is sustained, is directed, is stopped, and what kind of subjective reaction is present in the organism while all this is going on". Reconciling this definition with Figure 3, it can be seen that job characteristics arouse and combine with individual growth needs, so that behavior is directed toward goal accomplishment. As long as the job remains challenging, motivated behavior continues; when a task is completed, the behavior stops until a new task goal is presented or found. The subjective reaction of the organism while all this is going on should be partially reflected in the measure of intrinsic motivation (Cell 3).

Another aspect of the subjective reaction of the individual is one facet of job satisfaction that is tied to the work itself. The factors contributing to individuals' satisfaction with opportunities for growth on the job should be similar to those contributing to intrinsic motivation, as diagrammed in Figure 4. Theoretically, jobs high on "enriched"

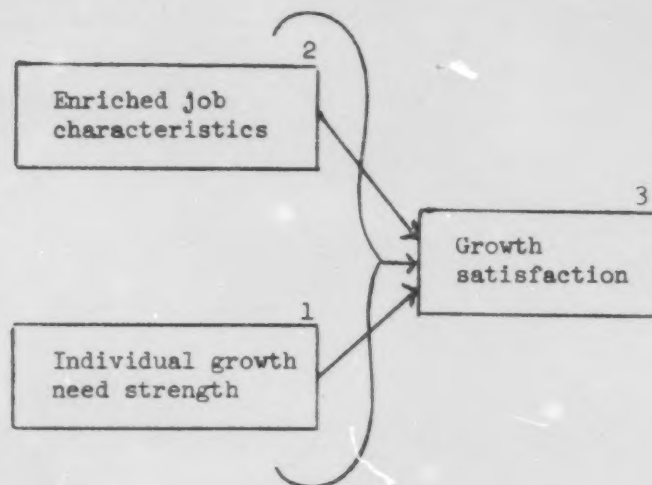


Figure 4. Model of some factors influencing satisfaction with opportunities for growth on the job.

characteristics should offer incumbents opportunities to grow on their jobs. These opportunities should be appreciated and used more by individuals with high growth needs than by those with low growth needs. Thus individual growth need strength (Cell 1), enriched job characteristics (Cell 2), and the interaction of Cells 1 and 2 (represented by the brackets) should each lead to growth satisfaction on the job as represented in Cell 3 of Figure 4.

Hypothesis Tests

Based on the literature reviews presented here and the models in Figures 3 and 4, the following specific hypotheses were made.

Hypothesis I. Performance = Ability + Intrinsic motivation +
(Ability x Intrinsic motivation).

Thus it was hypothesized that ability and intrinsic motivation have direct effects on performance as well as an interactive effect on performance. A significant multiple R from a moderated multiple regression equation representing the hypothesis was considered a requirement for initial support. In addition, each component was expected to make a statistically significant contribution to the prediction, in a positive direction and in the order listed. Since the intent was to see if intrinsic motivation can enhance the prediction of performance from ability, the ability measure was purposely placed in the equation first. The interaction term was purposely placed last in the equation, since by definition two variables are said to interact in their accounting for variance in a third variable when they have a joint effect over and above any additive combination of their separate effects (Cohen & Cohen, 1975, p. 292).

Hypothesis II. Intrinsic motivation = Individual growth need strength + Enriched job characteristics + (Individual growth need strength x Enriched job characteristics).

Again, two main effects and an interaction were hypothesized to predict a third variable, and a significant multiple R was required for initial support. Each component was expected to make a significant contribution to the prediction in a positive direction, but there was no hypothesis about which main effect should precede the other in a multiple regression equation. For the same reason expressed for Hypothesis I, the interaction term was purposely placed last in the regression equation.

Hypothesis III. Growth satisfaction = Individual growth need strength + Enriched job characteristics + (Individual growth need strength x Enriched job characteristics).

This hypothesis was constructed in the same manner as Hypothesis II, except that satisfaction with opportunities for growth on the job was substituted for intrinsic motivation as the variable to be predicted. The same statistical stipulations made for Hypothesis II applied to Hypothesis III.

Procedure

Data were collected from a sample of clerical employees of a large metropolitan bank in the Northeastern United States. The employees' jobs were grouped into 17 homogeneous job categories by one of the Bank's job analysts. One job category which was primarily public relations oriented rather than primarily clerical in nature was eliminated by the researcher.

A requirement for adequate performance in all jobs was clerical speed and accuracy. All subjects had taken the CA-1 section of the Short

Employment Tests (Bennett & Gelink, 1972) prior to employment. This test measures clerical aptitude under speeded conditions (five minutes are permitted to accomplish as many as possible of 60 items requiring checking and classification). The number of items completed correctly in the allotted time was used as the measure of ability in Cell 4 of Figure 3.

The study was conducted concurrently with a study to validate employment tests for jobs in the Bank at the non-officer level. Supervisors were advised about the joint project by means of a letter from an officer of the Bank, shown in Appendix 1. In addition to informing the supervisors about the project, the letter requested that they complete a specially designed rating form, shown in Appendix 2. Since 116 jobs were represented in the 16 job categories, it was necessary that each supervisor rate both the job, with respect to its most important functional requirements, and his or her subordinate, with respect to performance on the job.

The rating form was prepared by the researcher after studying formal job descriptions for all the jobs. Major job functions were extracted from the job descriptions and listed on the form as 42 "work factors". Supervisors were instructed first to evaluate the requirements of their subordinate's job by indicating the importance of each work factor on a 5-point rating scale (1 = Never important, 2 = Seldom important, 3 = Sometimes important, 4 = Often important, 5 = Always important). The second step in the instructions was to evaluate the performance of the subordinate on each work factor rated "3", "4", or "5" on importance. The performance of subordinates was also rated on a 5-point scale (1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Superior).

The supervisors' forms were initially scored on four scales. Four independent raters agreed on 8 items that primarily represented speed, 12 items that represented primarily accuracy, and 18 items that were considered especially relevant to the ability test. In addition all 42 items collectively represented total performance. Each employee's rating was scored on Speed, Accuracy, Relevancy, and Total by calculating an average performance rating on the items marked on each scale. (Since the jobs varied, supervisors rated different employees on different sets of items.) For the final data analyses the mean Total rating was selected as the measure of Performance for Cell 5 of Figure 3. This single criterion was selected for two main reasons:

1. The median intercorrelation between Speed, Accuracy, Relevancy, and Total was .93 (range = .82 to .96), showing a high degree of agreement and overlap between them.

2. The Total score had the greatest number of items that supervisors could rate and was expected to be the most stable measure of performance.

The remaining variables in Figure 3 and 4 were measured by an employee questionnaire, administered to a series of small groups. A total of 800 staff members were invited to participate voluntarily in the study by means of a letter sent to them from a Bank officer. A copy of the letter is shown in Appendix 3. Selection of employees to invite was determined by (a) tenure in the Bank of at least six months to assure a meaningful performance evaluation, and (b) employment in a job which had been combined into one of the 16 job categories by the job analyst for test validation purposes.

The Bank officer and the researcher participated together in the administration of the questionnaire. The officer assured the staff

members of the Bank's sponsorship of the study, and the researcher assured them of the anonymity of individual results and answered any questions about the questionnaire items. Since some employees were unable to attend the first session scheduled for them, they were invited to attend one of a second series of meetings by the letter shown in Appendix 4. Usable questionnaires were completed by 542 employees.

The questionnaire administered to the employees was a modified version of Hackman and Oldham's (Note 6) Job Diagnostic Survey (JDS). All JDS items for the scales of importance to this study were included in the questionnaire (internal or intrinsic motivation; the five "core" job characteristics scales of skill variety, task identity, task significance, autonomy, and job feedback; growth need strength as measured on their 5-point scale of job preferences; and growth satisfaction). The scales of general satisfaction, social satisfaction, the three psychological states represented in the Hackman and Oldham theory and the job dimension of dealing with others were also included in the questionnaire (a) to add variety, and (b) to avoid possible response sets created by too much focus on intrinsic motivation factors. Items having to do with pay, security, and supervision were eliminated from the JDS at the request of the participating organization.

All scales except growth need strength had a 7-point range. Most of the scores for each 7-point scale were derived from two different sections of the questionnaire. Each section had a different format to reduce response biases. The job dimensions were measured in sections One and Two. Items measuring general satisfaction and internal motivation were interspersed with items measuring the three psychological states in sections Three and Five, both of which asked for extent of agreement

with a number of statements. The items in Section Three referred to the self, whereas those in Section Five referred projectively to estimates of the feelings of others in the same or a similar job as the respondent. Section Four measured individual satisfaction with social opportunities and opportunities for growth and development (growth satisfaction).

Section Six was the 5-point Job Choice section of the JDS, the only section in the questionnaire measuring growth need strength. Here respondents were asked to indicate their relative preference for 12 pairs of hypothetical jobs, each pair consisting of one job with characteristics relevant to growth need satisfaction and one job having the potential for satisfying one of a variety of other needs. The resulting questionnaire is shown in Appendix 5.

The scoring key for the employee questionnaire is given in Appendix 6. In each case, the scale score was the mean of the item responses for that scale. To calculate one score for enriched or "core" job characteristics, the items in all five scales were summed and averaged. This is in contrast to Hackman and Oldham's (1975) Motivating Potential Score, in which the five scales are combined into a complex multiplicative function (described in Chapter III). The simple average was chosen over the Motivating Potential Score for the sake of parsimony, since a comparison of the Motivating Potential Score with an additive model, a full multiplicative model and a multiple regression model showed the simpler additive model to be just as effective in terms of correlating with both motivation and satisfaction measures (Hackman & Oldham, Note 7). Moreover, an additive model does not require that the scales be ratio scales.

In addition to the test scores, supervisory ratings, and questionnaires, the Bank provided biographical data about the participants, in-

cluding race, sex, tenure in the Bank, age, and job grade. Since there were too few Orientals and Spanish-surnamed Americans to permit race analyses for these groups, they were eliminated from the sample.

In Hypothesis I, ability was purposely placed first in the equation to test whether or not intrinsic motivation and the interaction of ability and motivation add anything to the prediction beyond the basic ability variable. The prediction of performance from ability was to be treated (if possible) as a necessary pre-existing condition. Therefore, job groups were also eliminated from the sample if the ability test had negative or extremely low positive correlations with performance. Five job groups were eliminated on this basis, leaving a final sample size of 353 employees in 74 clerical jobs. Correlations between ability and performance for the 11 remaining job groups ranged from .05 to .36, with a median r of .20. Although the median correlation could have been raised by eliminating more job groups, it was considered undesirable to do so both because a large sample size is generally preferable for multiple regression analyses and because eliminating more job groups would have made comparisons by race and sex almost impossible.

As it was, the final sample consisted mostly of White females ($N = 250$, or 71% of the sample). Black males were the most underrepresented of the sex/race combinations ($N = 10$, or 3% of the sample). Nevertheless, it was possible to make some comparisons by race (298 Whites vs. 55 Blacks) and by sex (295 females vs. 58 males). The mean age of subjects in the sample was 30 years, and the mean tenure in the Bank was 3 years, 2 months. Neither age nor tenure was related to sex, but Blacks were significantly younger ($r_{pb} = .11$, $p < .05$) and had significantly less tenure ($r_{pb} = .14$, $p < .01$) than Whites.

CHAPTER V
RESULTS AND DISCUSSION

Measurement Scales and Their Relationships

The means, standard deviations, reliabilities, and intercorrelations among the major variables of interest are shown in Table 1. The mean ability score was at the 60th percentile of applicants for clerical work in banks according to the test manual (Bennett & Gelink, 1972). An above average test score for comparable job applicants was expected since the test is used by the Bank for selection.

Comparable data were available for some of the questionnaire scales for 201 bank clerical workers from Oldham, Hackman, and Pearce (Note 8) and for 658 workers in 62 jobs in 7 organizations from Hackman and Oldham (Note 7). The mean internal or intrinsic motivation score was 5.16 in Oldham et al. (Note 8) and 5.39 in Hackman and Oldham (Note 7), which offers some support that the mean score of 5.26 found in this study is not atypical. The growth satisfaction mean score of 4.23 found here was somewhat, but not markedly, lower than the mean score of 4.82 found in Hackman and Oldham (Note 7). There was no basis of comparison for the average of enriched or core job characteristics since both of the aforementioned studies used the Hackman and Oldham (1975) multiplicative Motivating Potential Score; however, the mean of 4.42 and standard deviation of 1.01 found here seem reasonable for a 7-point scale.

Both of the 5-point scales reported here (growth need strength and performance) also seem to have reasonable mid-range means. Although mean growth need strength for this scale was not calculated in the

Table 1
Means, Standard Deviations, Reliabilities, and
Intercorrelations Among Variables

Variable	$\bar{X}$	S.D.	Relia- bility C	Intercorrelations					
				A	M	J	G	S	P
A = Ability	30.32	7.94	.81	--	-.04	.00	.08	-.05	.18***
M = Intrinsic motivation	5.26 ^a	1.06	.78		--	.54***	-.02	.59***	.12*
J = Enriched job characteristics	4.42 ^a	1.01	.81			--	.07	.69***	.14**
G = Growth need strength	3.13 ^b	.51	.70				--	-.17**	.18***
S = Growth satisfaction	4.23 ^a	1.59	.84					--	.13*
P = Performance	3.59 ^b	.61	.96						--

Note. N = 353

^aSeven-point scales

^bFive-point scales

^cSee text for explanation of individual reliability coefficients.

* $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed)

Hackman and Oldham (Note 7) study, the authors indicated that it was approximately 3.0, which is similar to the mean score of 3.13 found here. The mean reported for this same scale in Oldham et al. (Note 8) was 4.24, however. This seems high for a 5-point scale, suggesting that the results found by Hackman and Oldham may be atypical, not those found here.

The reliability coefficients reported in Table 1 were computed by several methods. For the ability measure, the coefficient of .81 is alternate-form reliability as reported in the test manual (Bennett & Gelink, 1972). Since the test is speeded (there is a time limit of only five minutes), a measure of internal consistency reliability would not be appropriate.

The remaining reliability coefficients in Table 1 measure internal consistency, and were computed using the average item intercorrelation augmented for scale length by the Spearman-Brown formula. As was the case for means and standard deviations, there is no comparable reliability figure from other studies for the sum of core job characteristics, but the coefficient of .81 found here indicates adequate stability. All the reliability coefficients found here for the questionnaire scales are sufficiently high to indicate scale stability and compare favorably to those reported in Hackman and Oldham (Note 7) and Oldham et al. (Note 8).

The reliability of the total performance rating score depends on the number of items answered. It will be recalled that supervisors first indicated which work factors on the rating form were important to the job being evaluated and then rated their subordinates only on those factors that were considered at least "Sometimes important". The mean inter-item correlation on the form was .55. Therefore, if a supervisor had rated an employee on all 42 items, the internal consistency reli-

ability figured from the Spearman-Brown formula would be .98. Since no supervisor rated all 42 items, a more conservative estimate was appropriate. At least half of the raters responded to the same 19 items. Using 19 items as a conservative estimate of scale length, the internal consistency reliability coefficient is still .96, as reported in Table 1. Such a high reliability coefficient shows very strong agreement and probably reflects a good deal of "halo" in rating employees.

Results of Hypothesis Tests

The results of the regression analyses testing the hypotheses presented in Chapter IV are shown in Table 2. In terms of the overall multiple R, all hypotheses were supported at $p < .001$. The ability and motivation composite predicted performance with $R = .22$, and the composites of enriched job characteristics and growth need strength predicted motivation with $R = .54$ and growth satisfaction with $R = .73$.

The overall multiple R's do not tell the whole story, however. In Hypothesis I, it was expected that performance would first be correlated positively with ability. This result is confirmed in Table 1 ($r = .18$, $p < .001$) and was, in fact, partly brought about by the selection of the subsample from the original sample. Hypothesis I also stated that adding intrinsic motivation would increase the prediction of performance from ability. This step was also confirmed by an F test for the increment in the multiple R (McNemar, 1962), as shown in Table 2. Finally, Hypothesis I predicted that the interaction of ability and intrinsic motivation would add significantly more to the prediction of performance; this part of the hypothesis was not confirmed, as shown in Table 2. Thus the results show that intrinsic motivation increases the prediction of

Table 2
Results of Regression Analyses Testing Hypotheses

Model	R	Increment
Hypothesis I: Correlations with Job Performance		
A	.18***	] F = 5.33*
A + M	.22***	
A + M + (A x M)	.22***	] F = .71 <u>ns</u>
Hypothesis II: Correlations with Motivation		
J	.54***	] F = 1.30 <u>ns</u>
J + G	.54***	
J + G + (J x G)	.54***	] F = .35 <u>ns</u>
Hypothesis III: Correlation with Growth Satisfaction		
J	.69***	] F = 22.40***
J + G	.73***	
J + G + (J x G)	.73***	] F = .80 <u>ns</u>

Note. N = 353

*p < .05, **p < .01, ***p < .001, ns = non-significant

performance from ability in an additive way but not in an interactive way.

In Hypothesis II, since no priority was given to which of the main variables, enriched job characteristics or individual growth need strength, would enter first into the multiple regression equation, these two variables were permitted to enter stepwise. Since intrinsic motivation correlated strongly with enriched job characteristics ($r = +.54$) and almost not at all with growth need strength ($r = -.02$), the job characteristics entered the multiple regression equation first. Neither of the next two steps--adding growth need strength or the interaction of enriched job characteristics and growth need strength--significantly increased the multiple R.

Thus Hypothesis II received support only because of the correlation of one variable, enriched job characteristics, with intrinsic motivation. Oldham et al. (Note 8) likewise found a significant correlation of .36 between their combined measure of enriched job characteristics (Motivating Potential Score) and internal motivation for 201 clerical workers ($p < .001$), and an r of .00 between growth need strength and internal motivation. Hackman and Oldham (Note 7) also found that Motivating Potential Score correlated more strongly than growth need strength with internal motivation (r 's = .46 and .17 respectively for an N of 658), although the growth need strength r was statistically significant at $p < .001$ in their study. The pattern of results produced in testing Hypothesis II is not wholly inconsistent with past research, then, although the model in Figure 3 was only partially supported.

The same predictors tested in Hypothesis II were expected to add to the prediction of growth satisfaction according to Hypothesis III. Again, enriched job characteristics entered the multiple regression equation

first with a zero-order correlation of .69. Adding growth need strength increased the multiple R to .73, a statistically significant increment. However, the beta weight for growth need strength was negative in this regression equation, reflecting the fact that growth need strength had a significant correlation with growth satisfaction in the negative direction ($r = -.17$, $p .001$). Consequently the significant incremental F cannot be taken as support for Hypothesis III, since having greater growth need strength was related to having a lesser degree of growth satisfaction.

The negative relationship between growth need strength and growth satisfaction is contrary to the finding of Hackman and Oldham (Note 7), who found a low positive relationship ($r = .08$, $p < .05$). Hall and Nougaim (1968) also found significant positive correlations within the same time period for need strength and need satisfaction of achievement/esteem and self-actualization needs. Lawler and Suttle (1972) found no significant relationship for simultaneous strength of and satisfaction of Maslow's higher order needs akin to growth (Maslow, 1970). The findings in the present study regarding growth need strength and growth satisfaction are therefore inconsistent with other empirical findings, and an explanation of the inconsistency is not immediately apparent. This is especially problematic since Hackman and Oldham (Note 7) used the same JDS scales as those used here. Neither their study nor the present one showed substantial results with the JDS scales, but the correlations were statistically significant in opposite directions.

The third component hypothesized to contribute to the prediction of growth satisfaction was the interaction of enriched job characteristics and growth need strength. This interaction did not contribute signifi-

cantly to the multiple R, as shown in Table 2.

The models in Figure 1 and 2 were not supported by the data of this study. The findings suggest the models should be modified in two major ways. In the first place, all parenthetical expressions should be eliminated, since none of the interaction terms added significantly to the prediction of the three criteria. Secondly, growth need strength did not contribute in the specified way to the prediction of intrinsic motivation or growth need satisfaction and should be eliminated from the models. The results of this one study, especially non-significant results, are not sufficient grounds for making such modifications to the model, of course.

Additional Regression Analyses on Performance

The intercorrelation matrix presented in Table 1 suggests a further analysis before eliminating growth need strength as a meaningful predictor in Figure 3, even with the results of this study. The regression of intrinsic motivation on growth need strength and enriched job characteristics was calculated to test the model in Figure 3. The results showed that job characteristics accounted for 25% of the variance in the motivation scale, while growth need strength accounted for none of it. On the other hand, growth need strength correlated .18 with performance ($p < .001$) and was relatively independent of enriched job characteristics or ability. It was hypothesized, then, that a major defect in the testing of the model with this data could be the measurement of intrinsic motivation. If this is true, it seems more appropriate to deal only with the three primary independent variables (ability, enriched job characteristics, and growth need strength) as inputs to the prediction of performance in

the present study.

Before proceeding with this modified approach, each pair of independent variables and their interaction were examined as possible predictors of performance. Thus the following exploratory hypotheses were tested:

Hypothesis IV. Performance = Ability + Growth need strength +
(Ability x Growth need strength).

Hypothesis V. Performance = Ability + Enriched job characteristics + (Ability x Enriched job characteristics).

Hypothesis VI. Performance = Growth need strength + Enriched
job characteristics + (Growth need strength x Enriched
job characteristics).

The results of these analyses are shown in Table 3. In each case, the first main effect was significant, adding the second main effect was statistically significant according to the incremental F test, but adding the interaction did not add significantly to the prediction of performance. All regression weights for the main effects were in a positive direction. The final multiple R's were approximately the same for each two-variable model. Thus the use of all three primary independent variables as predictors of performance appeared defensible.

Finally, a three-variable model was tested. The complete model would hypothesize that ability should correlate with performance; that growth need strength and enriched job characteristics would each then add a significant component to the prediction; that the three two-way interactions of the three variables would add significantly more to the prediction; and that the three-way interaction would add significantly even more to the prediction. The usefulness of the interaction terms

Table 3
Results of Additional Regression Analyses on Performance

Two-Variable Models	R	Increment
A	.18***	F = 10.10**
A + G	.25***	
A + G + (A x G)	.25***	
A	.18***	F = 7.14**
A + J	.23***	
A + J + (A x J)	.24***	
G	.18***	F = 5.95*
G + J	.23***	
G + J + (G x J)	.23***	
Three-Variable Models	R	Increment
A	.18***	F = 10.07**
A + G	.25***	
A + G + J	.28***	
A + G + J + (A x G) + (A x J) + (G x J)	.30***	F = 1.21 <u>ns</u>
A + G + J + (A x G) + (A x J) + (G x J)	.30***	
A + G + J + (A x G) + (A x J) + (G x J)	.30***	
		F = .95 <u>ns</u>

Note. N = 353

p < .05, **p < .01, ***p < .001

appears possible theoretically but improbable empirically, since none of the interaction terms in any equations tested so far with this data had been meaningfully related to the criteria.

As expected, the results in Table 3 indicate that while each of the three variables made an additive contribution to the prediction of performance in a positive direction, adding neither the two-way interactions nor the three-way interaction had a significant impact. A final F test was calculated to see if the three-way interaction added significantly to the three main effects, ignoring the two-way interactions. This also was not significant.

The additional analyses indicated that, for this data, the most explanatory and yet the most parsimonious model for predicting performance from ability and intrinsic motivation and its determinants is as shown in Figure 5.

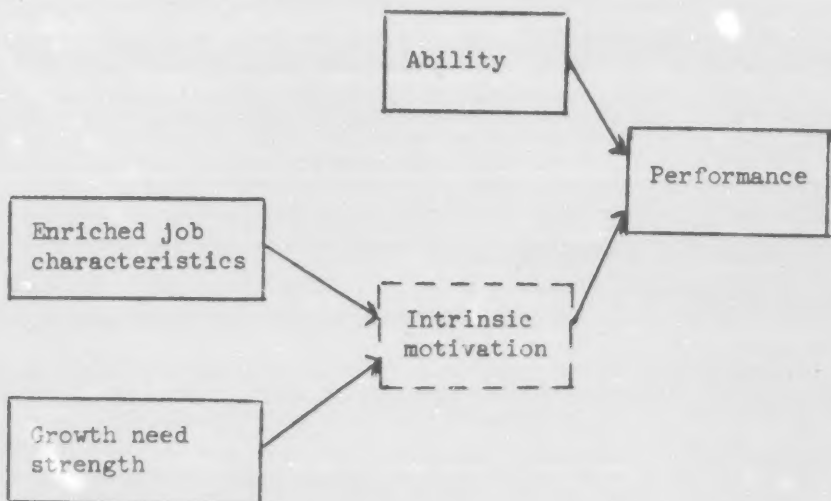


Figure 5. Modified model of ability and intrinsic motivation factors affecting performance.

Analysis of Results by Race and Sex

As indicated in Chapter IV, the composition of the sample was primarily White females. Nevertheless there were enough Blacks and males to permit some simple comparisons by race and sex.

The means and standard deviations of the variables by race and sex are shown in Table 4, along with t-tests for the significance of difference between means. Where the t-tests were significant, the majority group had higher scores. That is, Whites scored significantly higher than Blacks on ability and performance, and females scored higher than males on ability and enriched job characteristics. The ability differences by race were not surprising since they are frequently found. Differences in job performance in favor of Whites have also been reported among a variety of studies in the literature (Boehm, 1972). Since the ability test measured clerical aptitude, or perceptual speed and accuracy, the finding of higher average scores for females was also a replication of previous findings (Maccoby & Jacklin, 1974, pp. 38-39).

The finding that females reported their jobs to be higher on enriched job characteristics was somewhat surprising in light of the fact that the males were, on the average, in jobs of a higher level (r_{pb} of job grade and sex = $-.27$, $p < .001$). Whites were also in higher level jobs than Blacks (r_{pb} of job grade and race = $-.23$, $p < .001$), yet this did not result in the expected significant difference in their perceptions of the enriched nature of their jobs. One answer to this enigma may come from perceptions of challenge. In the world of work generally, White males may have higher expectations of what a job should be, since they have traditionally held more challenging and autonomous jobs. Consequently males may perceive the same job as less challenging than females, and

Table 4

Means and Standard Deviations of Variables by Race and Sex

Variable	Whites (N = 298)		Blacks (N = 55)		Mean Differ- ence	t	p
	$\bar{X}$	S.D.	$\bar{X}$	S.D.			
Ability	31.04	7.55	26.82	8.61	+4.22	3.73	.001
Intrinsic motivation	5.30	1.05	5.00	1.05	+ .30	1.95	ns
Enriched job characteristics	4.44	1.02	4.33	.99	+ .11	.74	ns
Growth need strength	3.13	.53	3.13	.42	.00	-	ns
Growth satisfaction	4.26	1.63	4.03	1.35	+ .23	1.00	ns
Performance	3.63	.58	3.37	.71	+ .26	2.95	.01

Variable	Females (N = 295)		Males (N = 58)		Mean Differ- ence	t	p
	$\bar{X}$	S.D.	$\bar{X}$	S.D.			
Ability	30.98	7.69	26.93	8.42	+4.05	3.62	.001
Intrinsic motivation	5.29	1.05	5.09	1.05	+ .20	1.32	ns
Enriched job characteristics	4.49	1.00	4.08	1.00	+ .41	2.85	.01
Growth need strength	3.11	.52	3.23	.45	- .12	1.71	ns
Growth satisfaction	4.29	1.58	3.95	1.62	+ .34	1.49	ns
Performance	3.60	.61	3.53	.60	+ .07	.80	ns

Whites may perceive the same job as less challenging than Blacks.

Another possible answer is that a higher job grade does not necessarily reflect a more enriched job. Job grades are assigned for salary administration purposes, and factors like carrying large amounts of money (which males did more frequently than females) could raise the job grade but enrich the job very little.

Table 5 shows the zero-order correlations of variables and composites with criteria for each race and sex. The composites were derived using the regression weights from the combined sample and were treated as simple variables in the intercorrelation matrix.

The predictions of motivation and growth need satisfaction from their proposed determinants were almost identical by race and sex, a notable absence of differential prediction. The correlations with performance showed noticeable differences, however, especially by race. All variables and composites correlated significantly with performance for Whites and females, an expected finding since White females comprised the majority of the sample from which the regression weights were derived. None of the correlations with performance was significant for Blacks. Moreover, the magnitude of the correlations was generally too small to suggest that simply increasing the sample size somewhat would yield significant results.

Most of the correlations with performance were non-significant for males also, although the magnitude of the r 's was generally higher than those for Blacks. The most pronounced differences between the race and sex analyses appear in the last two rows of Table 5. In spite of non-significant r 's between any of the main variables and performance for males, the Ability + Growth need strength + Enriched job characteristics

Table 5

Zero-Order Correlations of Variables and Composites with Criteria by Race and Sex

	Whites (N = 298)	Blacks (N = 55)	Females (N = 295)	Males (N = 58)
<u>Correlations with Motivation</u>				
Enriched job characteristics	.53***	.58***	.54***	.53***
Growth need strength	-.01	-.09	-.04	.11
Job/GNeed composite	.53***	.62***	.55***	.53***
<u>Correlations with Growth Satisfaction</u>				
Enriched job characteristics	.70***	.64***	.69***	.71***
Growth need strength	-.17**	-.17	-.17	-.16
Job/GNeed composite	.74***	.63***	.72***	.74***
<u>Correlations with Performance</u>				
Ability	.17**	.13	.17**	.21
Motivation	.11*	.07	.13*	.05
Ability/motivation composite	.21***	.15	.22***	.20
Enriched job characteristics	.15**	.09	.13*	.21
Growth need strength	.23***	-.05	.18**	.25
Ability/Job composite	.23***	.16	.22***	.19
Ability/GNeed composite	.28***	-.04	.22***	.31*
Ability/GNeed/Job composite, including interactions	.32***	.01	.25***	.37**
Ability/GNeed/Job composite, without interactions	.30***	.06	.25***	.36**

* $p < .05$, ** $p < .01$, *** $p < .001$

composite correlated significantly with performance ($p < .01$) either with or without the interaction terms. These correlations were .37 and .36 for males, compared to .01 and .06 for Blacks. (The two samples had an overlap of 10 Black males, which makes the difference even more notable.)

A suggested interpretation can be found by examining some of the other data. The only other composite which correlated significantly with performance for males was that of ability and growth need strength. A re-examination of Table 4 shows that the only reversal of the trend for the Whites and females to have higher scores than the Blacks and males was growth need strength for males. This sex difference was not statistically significant, but it was a reversal of the pattern and the probability of the difference being that great by chance was less than .10. Hackman and Oldham (Note 6) also found that males scored higher on growth need strength, although tests of statistical significance were considered inappropriate for their data.

While no conclusions can be drawn from non-significant results, the tentative suggestion is offered that there may be a compensatory factor operating here for males. Though generally lower than females in clerical ability, if males had greater growth need strength this could possibly be a counterbalancing factor producing a significant composite prediction of performance. That a compensatory model is tenable is indicated by the standardized regression weights derived from the total sample. In both the Ability/GNeed composite and the Ability/GNeed/Job composite, these weights were approximately the same for all main effects.

On the other hand, mean scores for the Blacks did not reveal any variables measured in this study that would (at this time) compensate for their lesser clerical ability. But some other evidence could be

interpreted as indicating that this need not always be the case. In both the White and Black samples, intrinsic motivation was positively correlated with tenure in the Bank ($\underline{r} = .18$, $p < .01$ for Whites; $\underline{r} = .28$, $p < .05$ for Blacks). This could mean that with more experience in the organization, the Blacks might be given the opportunity to develop additional intrinsic motivation.

Such as increase in intrinsic motivation would more likely come from increased exposure to enriched job characteristics than from an increase in growth need strength, according to these data. Apart from the fact that enriched job characteristics were the primary determinants of intrinsic motivation as measured in this study, other findings lead to the same conclusion. In the White sample, tenure did not relate significantly to growth need strength ($\underline{r} = -.05$) but did related positively to enriched job characteristics ($\underline{r} = .20$, $p < .001$). One interpretation of these relationships is that growth need strength may be a more stable, long-term characteristic of individuals while for any given individual, job characteristics may much more easily change with time. Specifically, individuals may be advanced to more challenging jobs as they gain experience and can handle more responsibility. Although neither growth need strength nor enriched job characteristics correlated significantly with tenure for the Black sample ($\underline{r} = -.12$ and $+.20$ respectively), two of the core job characteristics did relate positively to tenure--task identity and autonomy (both $\underline{r}$'s = $.30$, $p < .05$). This suggests that the interpretation applied to the Whites may be similarly applied to the Blacks.

The arguments above assume a specific causal relationship; i.e., gaining experience increases the likelihood of having challenging job

assignments. Moreover the assumption is made that gaining experience does not "cause" increases in growth need strength or in ability, since correlations of these two variables with tenure were not significant for the total sample. Rather, these individual differences variables are more long-term, stable characteristics that do not change much over time.

These correlational data can be subjected to different interpretations, however. Employees who have experienced more enriched jobs may be more likely to stay with the organization, or other unmeasured variables could create the correlation between enriched job characteristics and tenure. For example, employees who stay on a job may have to reduce any cognitive dissonance (Festinger, 1957) created by continuing to work at a job which was initially perceived as rather dull. Forgetting hypothetical unmeasured variables for the moment, the implications from either causal interpretation of the measured variables is the same: enrich the employees' jobs. (This would not be expected to change the correlation of enriched job characteristics and performance but to raise the average level of intrinsic motivation and performance.) Enriching jobs may be especially important for the Blacks, whose ability and performance were significantly lower than those of the Whites.

Although there is no direct evidence from the correlations in Table 5 that enriched jobs would increase performance for Blacks, there is at least strong evidence that it might increase growth satisfaction. One suggestion for future research is to enrich the jobs of the Blacks by work redesign or personnel placement and, after a sufficient time, collect new data from the same individuals. In particular, it would be interesting to see if their perceptions of enriched job characteristics increase, if these perceptions relate to performance, and if an

Ability/Job composite or an Ability/GNeed/Job composite will then significantly predict performance. Turnover rates for this experimental group could be contrasted with a comparable control group whose jobs were not enriched to explore the tenability of the alternative causal interpretation of the correlations found in this study.

Another dimension should be explored in studying the performance of Blacks in enriched jobs. Oldham et al. (Note 8) hypothesized that dissatisfaction with environmental or contextual factors may moderate the impact of enriched work, since such dissatisfaction may distract employees from whatever richness exists in the work itself. In other words, when employees are not satisfied with their pay, job security, co-workers and/or supervisors, their response to an enriched job may be diminished.

Although extrinsic motivation and satisfaction were not studied in this research, social satisfaction (with co-workers, not supervisors) was included as a supplementary measure. In Oldham et al.'s (Note 8) study using the JDS with 201 clerical workers in a bank, social satisfaction moderated the relationship between Motivating Potential Score and performance. In the present study, Blacks were significantly less satisfied with social factors than were Whites ($r_{pb} = -.12, p < .05$), and social satisfaction was positively correlated with performance for the sample as a whole ($r = .18, p < .001$). The correlation of social satisfaction with performance did not quite reach statistical significance for Blacks ($r = .23, p < .10$), although its magnitude was greater than that for Whites. Although the data are inconclusive, a pre-existing condition for Blacks to respond to enriched job characteristics may be increased co-worker cooperation and acceptance.

Concluding Remarks

The most important finding from this research was that ability and motivation predicted job performance in an additive way but not in an interactive way. Whether motivation was measured by a direct measure of intrinsic motivation or by either of its assumed determinants, the finding of additivity but no interaction was supported. This was especially noteworthy in light of the fact that one of the hypothesized determinants was a perceived organization factor (enriched job characteristics) and one was an individual non-ability factor (growth need strength). Statistical analyses based on the revised model (Figure 5) provided evidence that over and above the prediction of job performance provided by ability, growth need strength makes a useful contribution, and over and above both of the highly individual differences-oriented factors, enriched job characteristics make a useful contribution. The interactions of any or all of these terms were not useful in prediction. It is possible, of course, that to the extent that the measures departed from being true ratio scales, their products may contain error and hence their interactions may be more difficult to demonstrate.

What does the finding of no interaction mean? Statistically it means that the prediction of job performance from ability and intrinsic motivation (or its determinants) is linear rather than nonlinear in nature. Increased intrinsic motivation raises average levels of performance, and adding measures of ability increases the predictability of job performance. The absence of an interaction means that there is no greater impact of "adding" the same amount of motivation to a high ability person than to a low ability person.

At the practical level, the modified model suggests that job performance will be increased both by selecting employees of high ability and higher growth need strength and by placing them on jobs perceived as enriched. Yet since no interaction effects were found, either method of increasing motivation can be used with persons at any ability level without concern for the individual's standing on the other motivational variable. That is, if a job enrichment program were undertaken, there need be no particular concern about whether or not the employees whose jobs were enriched had high growth need strength or not. Enriching the jobs should add a relatively constant, positive motivational factor across employees, at least at the clerical level and for the types of employees studied here. Conversely, one could select employees for higher growth need strength, and expect a motivation gain from such selectivity whether they were placed in jobs of high or low degrees of enrichment.

One direction that future research can take is to confirm in both the same and different types of settings whether or not the interaction of ability and motivation is indeed a myth. If multiple regression methods are used properly to test the hypothesis, any interactive effects found can be tested for their relative usefulness. If interactions are found in some circumstances but not others (for example they may appear in laboratory settings but not field settings, or in high level jobs but not low level jobs), these circumstances and contingencies need to be defined. The issue of whether or not ability and motivation interact is not just a theoretical debate--it can affect policy decisions such as how best to approach work redesign. In fact, installations of work redesign projects offer the opportunity to test the various models pre-

sented here as field experiments. Such experiments would be more definitive given a refinement of the measures of the key variables to be studied.

One aspect of the results of this research that cannot be ignored is the small magnitude of both simple and multiple correlations. Even though steps were taken to maximize the validity coefficients for the ability test, the resulting correlation was approximately the same as the average reported by Ghiselli (1966). The highest test validity coefficient for any one job group was .36, which is also approximately the same as the average maximum correlation between ability tests and performance (Ghiselli, 1966).

As a result of the generally low correlations, only a small percentage of the variance in job performance was accounted for. It should be noted, however, that one important class of determinants of job performance, extrinsic motivation, was not included in this research. This means that even given perfect measurement of all the variables in the research, prediction of performance would necessarily be incomplete. Another factor which could have diminished the size of the correlations was restriction of range due to use of the ability test in selection.

In this study, ability alone accounted for 3% of the variance in performance; adding intrinsic motivation, it was possible to explain 5% of the variance. With the modified model, adding growth need strength to ability increased the proportion of variance in job performance accounted for to 6%, and adding enriched job characteristics to the other two predictors meant that 8% could be accounted for. The fact that these three variables each added meaningfully to the prediction in an additive but not an interactive way is provocative. The fact that they

all added so little is discouraging.

The failure to confirm the main effect of growth need strength as a predictor of intrinsic motivation pointed to a possible problem in one or both measures. One alternative was to declare the growth need strength measure problematic and unusable. Not only did this scale fail to predict intrinsic motivation, it had an unexpected negative correlation with growth satisfaction. That there should always be a positive correlation between growth need strength and growth satisfaction is not well grounded in theory, however. It seems reasonable that employees who really want challenging jobs might be more dissatisfied with the routine nature of clerical work than employees who are less interested in being challenged.

The growth need strength measure was retained and the intrinsic motivation measure dropped for other empirical and theoretical reasons. In spite of its lack of correlation with intrinsic motivation, growth need strength related significantly to performance, the final criterion. Moreover, multiple regression analyses supported the use of growth need strength, enriched job characteristics and ability in the prediction of performance. This three-variable equation accounted for 2/3 more variance in job performance than did the combination of ability and the motivation measure. Previous models (Hackman & Oldham, 1975; Robey, 1974; Wanous, 1974; Oldham et al., Note 8) also used job characteristics and growth need strength to predict performance directly (although in an interactive design), so that elimination of the motivation measure is not unprecedented.

There was also a theoretical reason for retaining the growth need strength measure. The data supported the hypothesis that intrinsic motiva-

tion aided ability in the prediction of performance, and 29% of the variance in the intrinsic motivation measure was due to the variance in enriched job characteristics. The remaining 71% is a mystery. The JDS intrinsic motivation measure simply says that good performance on the job leads to good feelings and poor performance leads to bad feelings; why more enriched jobs lead to those feelings is unspecified. Moreover, the motivation scale includes two items that are not individualized but require speculation about the feelings of others on the same or a similar job. The discovery in this research that growth need strength adds significantly to the prediction of job performance along with enriched job characteristics and ability supplied an individual differences component that aided the understanding of the intrinsic motivation construct.

The construct of intrinsic motivation is essential to the modified model of Figure 5, however. Task characteristics cannot influence job performance directly; they can only do so by influencing the individual's intrinsic motivation. The same may be said for growth need strength. Perhaps the construct of intrinsic motivation is too complex to be measured by a few simple questionnaire items. Individuals may be aware that they prefer challenging jobs and be aware of how challenging their jobs are--especially experienced employees. But it may be difficult to realize that one is intrinsically motivated to perform well on a job because the end result will be the satisfaction of a very basic need (an innate need according to Deci, 1975 and Maslow, 1970) to be competent and self-determining. Perhaps judgments of intrinsic motivation from depth interview data or projective tests are alternatives worth exploring. As for this research, in the end we are left with an empty box--a construct within a model but without a measure.

APPENDIX 1
LETTER TO SUPERVISORS

July, 1975

To: Supervisor Addressed

Subject: Test Validation Study

We are presently involved in a major research effort, as required by the Federal Government, to validate the tests presently used in selecting candidates for non-official jobs. The study is examining two factors: the extent to which test results are predictors of performance and secondly, the relationship between job characteristics, staff member interest and performance.

In order to make this research meaningful, we are asking you to complete an attached questionnaire for each staff member under your supervision who is included in the sample group. We are also asking the participating staff members to complete a separate questionnaire about their jobs and work interests.

The information that you provide will be reviewed only by our outside consulting firm. The results of this study will be reported to the Bank only for all participants as a group.

I am sure you understand that your accurate and candid responses are crucial to the success of the project.

Please return these forms, in the envelope provided, within one week if possible; the timing of this research is important.

Thank you for your cooperation.

(Name and title of officer)
Personnel Division

APPENDIX 2

SUPERVISOR'S RATING FORM

(The actual rating form was printed on one sheet of paper, 8 1/2 x 13 1/2 inches. The print was reduced in size and the page was arranged vertically.)

SUPERVISOR'S EVALUATION OF JOB AND PERFORMANCE

(For research purposes only)

Staff Member's Name _____ Job Title _____

Dept. # _____ Class (Job #) _____ Supervisor's Name _____

DIRECTIONS FOR SUPERVISORS

Part I: First we would like you to evaluate the requirements of the job shown. Please read each work factor listed below and indicate how important that factor is for the job you are evaluating. Put the appropriate number from the scale below under the "Job" column on the line next to each statement.

1	2	3	4	5
Never important	Seldom important	Sometimes important	Often important	Always important

Job	Performance	Work Factors
(1-4)	(12-13)	Prepares forms and documents accurately
(6-8)	(14-15)	Prepares forms and documents quickly
(10) 2	(16-17)	Expresses ideas clearly in writing
	(18-19)	Makes accurate computations
	(20-21)	Performs numerical operations rapidly
	(22-23)	Determines and makes correct adjustments to accounts or records
	(24-25)	Transcribes dictation
	(26-27)	Ensures proper utilization of machine time
	(28-29)	Verifies information correctly
	(30-31)	Verifies information quickly
	(32-33)	Codes information accurately
	(34-35)	Codes information quickly
	(36-37)	Creates or maintains favorable customer relations
	(38-39)	Makes arrangements for meetings, lunches and travel
	(40-41)	Maintains complete and accurate records and files

(1-4)
(6-8)
(10) 3

Job	Performance	Work Factors
(42-1)		Collects overdue payments
(44-45)		Develops improved systems and methods
(46-47)		Reconciles discrepancies in records
(48-49)		Sorts documents correctly
(50-51)		Sorts documents quickly
(52-53)		Promotes Bank's services
(54-55)		Assures that documents comply with regulations
(56-57)		Counts and proves moneys received
(58-59)		Maintains favorable officer and staff relations
(60-61)		Posts or records data accurately
(62-63)		Posts or records data quickly
(64-65)		Adheres to strict instructions or procedures
(66-67)		Typing accuracy
(68-69)		Typing speed
(70-71)		Distributes materials promptly
(72-73)		Exercises care in handling negotiable items
(74-75)		Operates complex equipment
(76-77)		Determines appropriate disposition of documents
(78-79)		Compiles information and prepares reports
(12-13)		Searches records and locates information
(14-15)		Makes or accepts payments with few errors
(16-17)		Establishes appropriate priorities in own work schedule
(18-19)		Trains other staff members
(20-21)		Assigns work to others efficiently
(22-23)		Gains the respect and cooperation of subordinates
(24-25)		Follows up work of subordinates
(26-27)		Establishes high standards of performance for subordinates

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Part II: Now we would like you to evaluate the performance of the staff member shown above on the most important job factors. Please go down the list of work factors again, and evaluate the staff member's performance on each work factor where you have put a 3, 4 or 5 under the "Job" column, i.e., "sometimes", "often" or "always" important. Put the appropriate number from the scale below under the "Performance" column on the line next to the statement.

1	2	3	4	5
Poor	Fair	Good	Very Good	Superior

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APPENDIX 3

INITIAL LETTER TO EMPLOYEES

July, 1975

To: Staff Member Addressed

Subject: Research Study

We are presently conducting a large research study at our Bank to determine how staff members' interests and abilities relate to their jobs. This information is not being requested with an immediate action plan in mind, but rather to provide some preliminary data for future consideration.

We would appreciate your filling out a short questionnaire about how you relate to your work assignments. Only our outside consulting firm will see your answers and these will be kept completely confidential. The results of the study will be reported to the Bank only for all participants as a group.

Participation in this study is wholly voluntary; however, we hope that you will help us with this project and complete a questionnaire at a 30 minute meeting to be held on (date and time) at (location).

(Name and title of officer)

Personnel Division

cc: (to supervisor)

APPENDIX 4

SECOND LETTER TO EMPLOYEES

August 26, 1975

To: Staff Member Addressed

Subject: Research Study

Several weeks ago, we asked if you would attend a meeting for the purpose of completing a short questionnaire in conjunction with a research study being conducted at our Bank. The study is to determine how Staff Members' interests and abilities relate to their jobs.

If you were unable to attend these previously scheduled meetings because of vacation or departmental schedules, we hope that you will be able to attend one of the 30 minute sessions shown below:

Thursday, August 28, 10:30 a.m. - Induction Room, H.O. 11

Thursday, August 28, 11:30 a.m. - Induction Room, H.O. 11

Thursday, August 28, 2:30 p.m. - Induction Room, H.O. 11

Wednesday, Sept. 3, 10:30 a.m. - Training Room 1, H.O. 11

Wednesday, Sept. 3, 11:30 a.m. - Training Room 1, H.O. 11

Wednesday, Sept. 3, 5:30 p.m. - Training Room 1, H.O. 11

Thursday, Sept. 4, 10:30 a.m. - Training Room 1, H.O. 11

Thursday, Sept. 4, 11:30 a.m. - Training Room 1, H.O. 11

Please feel free to call me on (Ext. #) if you have any questions.

(Name and title of officer)

Personnel Division

cc: (to supervisor)

APPENDIX 5

EMPLOYEE QUESTIONNAIRE*

THE (name of bank) SURVEY

AUGUST, 1975

*The actual questionnaire was contained in a five-page booklet, each page 8 1/2 x 11 inches. The print inside the booklet was reduced in size and the pages were arranged vertically.

This questionnaire is part of a large research study being conducted at our Bank by an outside consulting firm. Your individual answers will only be seen by that firm and the results of the study will be reported to the Bank only for all participants as a group.

Our consultants will be combining the responses you provide in this questionnaire with information from the tests you completed in the Personnel Division before you were hired; therefore, they need your name on the questionnaire in order to match this information.

The questionnaire is divided into several sections. Each section has its own set of instructions which should be read carefully before proceeding with that section. It should take no more than twenty minutes to complete. Please move through the choices quickly.

It is important that you answer each item as honestly and frankly as possible.

Thank you for your cooperation.

PRINT YOUR NAME HERE _____

SECTION ONE

This part of the questionnaire asks you to describe your job as objectively as you can. Please do not use this part of the questionnaire to show how much you like or dislike your job. Questions about that will come later. Instead, try to make your descriptions as accurate and as objective as you possibly can.

A Sample Question Is Given Below

A. To what extent does your job require you to work with mechanical equipment?

1-----2-----3-----4-----5-----6-----7

Very little; the
job requires almost
no contact with
mechanical equipment
of any kind.

Moderately

Very much; the job
requires almost con-
stant work with me-
chanical equipment.

YOUR ARE TO CIRCLE THE NUMBER WHICH IS THE MOST ACCURATE DESCRIPTION OF YOUR JOB

If, for example, your job requires you to work with mechanical equipment a good deal of the time--but also requires some paperwork--you might circle the number 6 as was done in the example above.

If you do not understand these instructions, please ask for assistance. If you do understand them, please begin.

1. To what extent does your job require you to work closely with other people (either customers, or people in related jobs in the Bank)?

1-----2-----3-----4-----5-----6-----7

Very little, dealing
with other people is
not at all necessary
in doing the job.

Moderately; some
dealing with others
is necessary

Very much, dealing
with other people
is an absolutely es-
sential and crucial
part of doing the
job.

2. How much autonomy is there in your job? That is, to what extent does your job permit you to decide on your own how to go about doing the work?

1-----2-----3-----4-----5-----6-----7

Very little, the job gives me almost no personal "say" about how and when the work is done.

Moderate autonomy; many things are standardized and not under my control, but I can make some decisions about my work.

Very much; the job gives me almost complete responsibility for deciding how and when the work is done.

3. To what extent does your job involve doing a "whole" and identifiable piece of work? That is, is the job a complete piece of work that has an obvious beginning and end? Or is it only a small part of the overall piece of work, which is finished by other people or by automatic machines?

1-----2-----3-----4-----5-----6-----7

My job is only a tiny part of the overall piece of work; the results of my activities cannot be seen in the final product or service.

My job is a moderate-sized "chunk" of the overall piece of work; my own contribution can be seen in the final outcome.

My job involves doing the whole piece of work, from start to finish; the results of my activities are easily seen in the final product or service.

4. How much variety is there in your job? That is, to what extent does the job require you to do many different things at work, using a variety of your skills and talents?

1-----2-----3-----4-----5-----6-----7

Very little; the job requires me to do the same routine things over and over again.

Moderate variety

Very much; the job requires me to do many different things, using a number of different skills and talents.

5. In general, how significant or important is your job? That is, are the results of your work likely to significantly affect the lives or well-being of other people?

1-----2-----3-----4-----5-----6-----7

Not very significant;
the outcomes of my
work are not likely
to have important ef-
fects on other people.

Moderately
significant

Highly significant;
the outcomes of my
work can affect other
people in very impor-
tant ways.

6. To what extent does doing the job itself provide you with information about your work performance? That is, does the actual work itself provide clues about how well you are doing--aside from any "feedback" co-workers or supervisors may provide?

1-----2-----3-----4-----5-----6-----7

Very little; the job
itself is set up so
I could work forever
without finding out
how well I am doing.

Moderately, some-
times doing the
job provides "feed-
back" to me; some-
times it does not.

Very much; the job is
set up so that I get
almost constant "feed-
back" about how well I
am doing.

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SECTION TWO

Listed below are a number of statements which could be used to describe a job. You are to indicate whether each statement is an accurate or an inaccurate description of your job.

Once again, please try to be as objective as you can in deciding how accurately each statement describes your job--regardless of whether you like or dislike your job.

WRITE A NUMBER IN THE BLANK BESIDE EACH STATEMENT, BASED ON THE FOLLOWING SCALE:

How accurate is the statement in describing your job?

1	2	3	4	5	6	7
Very inaccurate	Mostly inaccurate	Slightly inaccurate	Uncertain	Slightly accurate	Mostly accurate	Very accurate

_____ The job requires me to use a number of complex or high-level skills.

_____ The job requires a lot of cooperative work with other people.

_____ The job is arranged so that I do not have the chance to do an entire piece of work from beginning to end.

_____ Just doing the work required by the job provides many chances for me to figure out how well I am doing.

_____ The job is quite simple and repetitive.

_____ The job can be done adequately by a person working alone--without talking or checking with other people.

_____ This job is one where a lot of other people can be affected by how well the work gets done.

_____ The job denies me any chance to use my personal initiative or judgment in carrying out the work.

_____ The job provides me the chance to completely finish the pieces of work I begin.

_____ The job itself provides very few clues about whether or not I am performing well.

_____ The job gives me considerable opportunity for independence and freedom in how I do the work.

_____ The job itself is not very significant or important in the broader scheme of things.

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SECTION THREE

Now please indicate how you personally feel about your job. Each of the statements below is something that a person might say about his or her job. You are to indicate your own, personal feelings about your job by marking how much you agree with each of the statements.

WRITE A NUMBER IN THE BLANK FOR EACH STATEMENT, BASED ON THIS SCALE:

How much do you agree with the statement?

	1	2	3	4	5	6	7
	Disagree strongly	Disagree	Disagree slightly	Neutral	Agree slightly	Agree	Agree strongly

_____	It's hard, on this job, for me to care very much about whether or not the work gets done right.				_____	I frequently think of quitting this job.	
_____	My opinion of myself goes up when I do this job well.				_____	I feel bad and unhappy when I discover that I have performed poorly on this job.	
_____	Generally speaking, I am very satisfied with this job.				_____	I often have trouble figuring out whether I'm doing well or poorly on this job.	
_____	Most of the things I have to do on this job seem useless or trivial.				_____	I feel I should personally take the credit or blame for the results of my work on this job.	
_____	I usually know whether or not my work is satisfactory on this job.				_____	I am generally satisfied with the kind of work I do in this job.	
_____	I feel a great sense of personal satisfaction when I do this job well.				_____	My own feelings generally are <u>not</u> affected much one way or the other by how well I do on this job.	
_____	The work I do on this job is very meaningful to me.				_____	Whether or not this job gets done right is clearly <u>my</u> responsibility.	
_____	I feel a very high degree of <u>personal</u> responsibility for the work I do on this job.						

SECTION FOUR

Now please indicate how satisfied you are with each aspect of your job listed below.

ONCE AGAIN, WRITE THE APPROPRIATE NUMBER IN THE BLANK BESIDE EACH STATEMENT

How satisfied are you with this aspect of your job?

1	2	3	4	5	6	7
Extremely dissatisfied	Dissatisfied	Slightly dissatisfied	Neutral	Slightly satisfied	Satisfied	Extremely satisfied

_____ The amount of personal growth and development
I get doing my job.

_____ The people I talk to and work with on my job.

_____ The feeling of worthwhile accomplishment I
get from doing my job.

_____ The chance to get to know other people
while on the job.

_____ The amount of independent thought and
action I can exercise in my job.

_____ The chance to help other people while
at work.

_____ The amount of challenge in my job.

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SECTION FIVE

Now please think of the other people in the Bank who hold the same job you do. If no one has exactly the same job as you, think of the job which is most similar to yours. Please think about how accurately each of the statements describes the feelings of those people about the job. It is quite all right if your answers here are different from when you described your own reactions to the job. Often different people feel quite differently about the same job.

ONCE AGAIN, WRITE A NUMBER IN THE BLANK FOR EACH STATEMENT, BASED ON THIS SCALE:

How much do you agree with the statement?

1	2	3	4	5	6	7
Disagree strongly	Disagree	Disagree slightly	Neutral	Agree slightly	Agree	Agree strongly

_____	Most people on this job feel a great sense of personal satisfaction when they do the job well.			_____	Most people on this job find the work very meaningful.	
_____	Most people on this job are very satisfied with the job.			_____	Most people on this job feel that whether or not the job gets done right is clearly their own responsibility.	
_____	Most people on this job feel that the work is useless or trivial.			_____	People on this job often think of quitting.	
_____	Most people on this job feel a great deal of personal responsibility for the work they do.			_____	Most people on this job feel bad or unhappy when they find that they have performed the work poorly.	
_____	Most people on this job have a pretty good idea of how well they are performing their work.			_____	Most people on this job have trouble figuring out whether they are doing a good or bad job.	

SECTION SIX

People differ in the kinds of jobs they would most like to hold. The questions in this section give you a chance to say just what it is about a job that is most important to you.

For each question, two different kinds of jobs are briefly described. You are to indicate which of the jobs you personally would prefer--if you had to make a choice between them.

In answering each question, assume that everything else about the jobs is the same. Pay attention only to the characteristics listed.

Two Examples Are Given Below

JOB A
A job requiring work
with mechanical equip-
ment most of the day.

JOB B
A job requiring work
with other people
most of the day.

1-----2-----3-----4-----5
Strongly Slightly Neutral Slightly Strongly
Prefer A Prefer A Prefer B Prefer B

If you like working with people and working with equipment equally well, you would circle the number 3, as has been done in the example.

Here is another example. This one asks for a harder choice--between two jobs which both have some undesirable features.

JOB A
A job requiring you to
expose yourself to con-
siderable physical danger

JOB B
A job located 200
miles from your home
and family.

1-----2-----3-----4-----5
Strongly Slightly Neutral Slightly Strongly
Prefer A Prefer A Prefer B Prefer B

If you would slightly prefer risking physical danger to working far from your home, you would circle number 2, as has been done in the example.

Please ask for assistance if you do not understand exactly how to do these questions.

CIRCLE THE NUMBER THAT INDICATES WHICH JOB YOU PERSONALLY WOULD PREFER

- | | Job A | | | Job B | | |
|--|----------------------|----------------------|---------|---|----------------------|--|
| 1. A job where the pay is very good. | | | | A job where there is considerable opportunity to be creative and innovative. | | |
| | 1----- | 2----- | 3----- | 4----- | 5----- | |
| | Strongly
Prefer A | Slightly
Prefer A | Neutral | Slightly
Prefer B | Strongly
Prefer B | |
| 2. A job where you are often required to make important decisions. | | | | A job with many pleasant people to work with. | | |
| | 1----- | 2----- | 3----- | 4----- | 5----- | |
| | Strongly
Prefer A | Slightly
Prefer A | Neutral | Slightly
Prefer B | Strongly
Prefer B | |
| 3. A job in which greater responsibility is given to those who do the best work. | | | | A job in which greater responsibility is given to loyal employees who have the most seniority. | | |
| | 1----- | 2----- | 3----- | 4----- | 5----- | |
| | Strongly
Prefer A | Slightly
Prefer A | Neutral | Slightly
Prefer B | Strongly
Prefer B | |
| 4. A job in an organization which is in financial trouble--and might have to close down within the year. | | | | A job in which you are not allowed to have any say whatever in how your work is scheduled, or in the procedure to be used in carrying it out. | | |
| | 1----- | 2----- | 3----- | 4----- | 5----- | |
| | Strongly
Prefer A | Slightly
Prefer A | Neutral | Slightly
Prefer B | Strongly
Prefer B | |

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CIRCLE THE NUMBER THAT INDICATES WHICH JOB YOU PERSONALLY WOULD PREFER

- | | JOB A | | | JOB B | | |
|--|----------------------|----------------------|---------|--|----------------------|--|
| 5. A very routine job. | | | | A job where your co-workers are not very friendly. | | |
| | 1----- | 2----- | 3----- | 4----- | 5----- | |
| | Strongly
Prefer A | Slightly
Prefer A | Neutral | Slightly
Prefer B | Strongly
Prefer B | |
| 6. A job with a supervisor who is often very critical of you and your work in front of other people. | | | | A job which prevents you from using a number of skills that you worked hard to develop. | | |
| | 1----- | 2----- | 3----- | 4----- | 5----- | |
| | Strongly
Prefer A | Slightly
Prefer A | Neutral | Slightly
Prefer B | Strongly
Prefer B | |
| 7. A job with a supervisor who respects you and treats you fairly. | | | | A job which provides constant opportunities for you to learn new and interesting things. | | |
| | 1----- | 2----- | 3----- | 4----- | 5----- | |
| | Strongly
Prefer A | Slightly
Prefer A | Neutral | Slightly
Prefer B | Strongly
Prefer B | |
| 8. A job where there is very little job security. | | | | A job with very little chance to do challenging work. | | |
| | 1----- | 2----- | 3----- | 4----- | 5----- | |
| | Strongly
Prefer A | Slightly
Prefer A | Neutral | Slightly
Prefer B | Strongly
Prefer B | |

- III -

CIRCLE THE NUMBER THAT INDICATES WHICH JOB YOU PERSONALLY WOULD PREFER

Job A

Job B

9. A job in which there is a real chance for you to develop new skills and advance in the organization.

A job which provides lots of vacation time and an excellent fringe benefit package.

1-----2-----3-----4-----5
Strongly Slightly Neutral Slightly Strongly
Prefer A Prefer A Prefer B Prefer B

10. A job with little freedom and independence to do your work the way you think best.

A job where the working conditions are poor.

1-----2-----3-----4-----5
Strongly Slightly Neutral Slightly Strongly
Prefer A Prefer A Prefer B Prefer B

11. A job with very satisfying teamwork.

A job which allows you to use your skills and abilities to the fullest extent.

1-----2-----3-----4-----5
Strongly Slightly Neutral Slightly Strongly
Prefer A Prefer A Prefer B Prefer B

12. A job which offers little or no challenge.

A job which requires you to be completely isolated from co-workers.

1-----2-----3-----4-----5
Strongly Slightly Neutral Slightly Strongly
Prefer A Prefer A Prefer B Prefer B

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APPENDIX 6

SCORING KEY FOR QUESTIONNAIRE

For each scale the calculated score for each respondent was the mean of the items listed for that scale. Not all scales were used in the research reported here.

I. Job Dimensions

A. Skill Variety

Section One: #4
Section Two: #1
#5 (reversed scoring; i.e., number entered is subtracted from 8)

B. Task Identity

Section One: #3
Section Two: #9
#3 (reversed scoring)

C. Task Significance

Section One: #5
Section Two: #7
#12 (reversed scoring)

D. Autonomy

Section One: #2
Section Two: #11
#8 (reversed scoring)

E. Feedback from the Job Itself

Section One: #6
Section Two: #4
#10 (reversed scoring)

F. Dealing with Others (Not a core job dimension)

Section One: #1
Section Two: #2
#6 (reversed scoring)

II. Experienced Psychological States

A. Experienced Meaningfulness of the Work

Section Three: #7
 #4 (reversed scoring)
Section Five: #6
 #3 (reversed scoring)

B. Experienced Responsibility for the Work

Section Three: #8, #12, #15
 #1 (reversed scoring)
Section Five: #4, #7

C. Knowledge of Results

Section Three: #5
 #11 (reversed scoring)
Section Five: #5
 #10 (reversed scoring)

III. Affective Responses to the Job

A. General Satisfaction

Section Three: #3, #13
Section Five: #2
 #8 (reversed scoring)

B. Internal (Intrinsic) Work Motivation

Section Three: #2, #6, #10
 #14 (reversed scoring)
Section Five: #1, #9

C. Social Satisfaction

Section Four: #2, #4, #6

D. Growth Satisfaction

Section Four: #1, #3, #5, #7

IV. Individual Growth Need Strength

Section Six: #1, #5, #7, #10, #11, #12
 #2, #3, #4, #6, #8, #9 (reversed scoring; i.e.,
 number entered is subtracted from 6)

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